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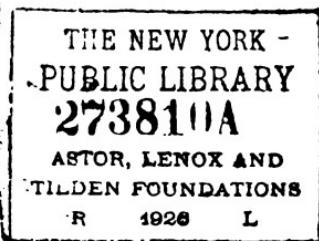








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# THE IRISH SCHOOL ARITHMETIC.

## PART I.

*This work is intended to supply a want which has been long experienced by the Teachers of Elementary Schools in Ireland.*

*It deals with the Practice rather than with the Theory of Arithmetic, the instruction in Theory being left to the Teacher.*

*Ample practice in calculation is provided in the shape of carefully graduated exercises on the various rules; and groups of miscellaneous questions are placed at different stages throughout the book.*

*The work is published in three parts. Part I. extends as far as Reduction of weights and measures; Part II. contains Simple Proportion, Vulgar and Decimal Fractions, and Practice; and Part III. the remaining rules.*

*The parts are published both with and without Answers.*

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ARITHMETIC is the Science which teaches the properties of numbers, and the art of making calculations by means of them.

A UNIT is *one* of anything ; as one man, one horse, one book.

NUMBER signifies a collection of two or more units of the same kind ; as two books, five men, twelve feet.

Numbers are either *Concrete* or *Abstract*.

*Concrete* numbers are those which are applied to particular objects ; as six horses, nine houses.

*Abstract* numbers are those which are used without reference to particular objects ; as six, nine.

The following are some of the signs used in Arithmetic :—

+ is called *plus* and signifies addition ; for example  $3+2$  means that 3 is added to 2.

R3 - is called *minus* and signifies subtraction ; for example  $3-2$  means that 2 is taken from 3.

6  $\times$  is the multiplication sign ; for example  $3 \times 2$  gives 6.

$\div$  is the division sign ; for example  $6 \div 3$  gives 2.

$=$  is the sign of equality ;  $3 \times 2 = 6$ .

C The remaining signs will be given and explained as they are required throughout the course.

## NOTATION AND NUMERATION.

NOTATION is the method of expressing numbers by means of figures ; as 1, 2, 3.

NUMERATION is the art of reading numbers which have been already expressed by figures ; as 1 is read *one*, 6 is read *six*.

The figures used to express numbers are as follows :—

1    2    3    4    5    6    7    8    9    0.

A good set of figures as they would appear on a slate would be something like the following :—

1    2    3    4    5    6    7    8    9    0

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## EXERCISES IN NOTATION.

### Exercise 1.

Write down in figures the following numbers :—

- (1.) Eight ; (2.) fifteen ; (3.) twenty-seven ; (4.) thirty ; (5.) one hundred ; (6.) one hundred and forty-five ; (7.) one hundred and sixty ; (8.) one hundred and seven ; (9.) two hundred and nineteen ; (10.) eight hundred and seventy ; (11.) nine hundred and nine ; (12.) six thousand ; (13.) four thousand three hundred and seventy-nine ; (14.) two thousand seven hundred and five ; (15.) nine thousand and sixty-five ; (16.) eight thousand and one ; (17.) seventy thousand and sixteen ; (18.) nine hundred and thirty thousand and eighty-five ; (19.) one hundred thousand ; (20.) three hundred thousand and one ; (21.) six hundred and seventy thousand and eleven ; (22.) nine hundred and ten thousand and ten ; (23.) six hundred and eleven thousand and fifty ; (24.) one hundred and one thousand and one.

Numbers of exercises in notation will be found throughout the Simple Rules.

## EXERCISES IN NUMERATION.

## Exercise 2.

Express the following numbers in words :—

- (1.) 17 ; (2.) 20 ; (3.) 25 ; (4.) 97 ; (5.) 163 ; (6.) 101 ; (7.) 111 ;  
 (8.) 910 ; (9.) 701 ; (10.) 2463 ; (11.) 9801 ; (12.) 7210 ; (13.) 9010 ;  
 (14.) 6011 ; (15.) 5005 ; (16.) 7015 ; (17.) 27010 ; (18.) 68345 ;  
 (19.) 90005 ; (20.) 600000 ; (21.) 710011 ; (22.) 120030 ; (23.) 601010 ;  
 (24.) 101001.
- 

## ROMAN NOTATION.

|          |            |           |
|----------|------------|-----------|
| I.=1.    | XI.=11.    | XXI.=21.  |
| II.=2.   | XII.=12.   | XXX.=30.  |
| III.=3.  | XIII.=13.  | XL.=40.   |
| IV.=4.   | XIV.=14.   | L.=50.    |
| V.=5.    | XV.=15.    | LX.=60.   |
| VI.=6.   | XVI.=16.   | LXX.=70.  |
| VII.=7.  | XVII.=17.  | LXXX.=80. |
| VIII.=8. | XVIII.=18. | XC.=90.   |
| IX.=9.   | XIX.=19.   | C.=100.   |
| X.=10.   | XX.=20.    | M.=1000.  |

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## SIMPLE ADDITION.

Addition is the process of finding the number equal to the sum of two or more numbers taken together. The numbers which are added together are called the *Addends*.

The sign of addition is +, and is called *plus*.

There are at least three ways of stating a sum in addition :—

(1.) Find the sum of, or add together 78, 218, and 9.

(2.)  $78+218+9$ .

(3.)

218

9

—

The children should be carefully trained from the very beginning to write their sums down neatly. They should make good figures and have the units *exactly* under the units, tens *exactly* under tens, and so on. Children often forget this and write their sums in this way :—

4072  
918  
6207  
1350  
12547

This is bad, and leads to mistakes, which would almost certainly be avoided by writing them as follows :—

|        |
|--------|
| 4,072  |
| 918    |
| 6,207  |
| 1,350  |
| <hr/>  |
| 12,547 |

**Proof:**—Add the columns downward, and if the same answer is obtained, the sum is almost certain to be correct.

### **Exercise 3.**

| (1.)      | (2.)      | (3.)      | (4.)      | (5.)      | (6.)      | (7.)      | (8.)      |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 2         | 3         | 6         | 7         | 5         | 7         | 3         | 8         |
| 4         | 7         | 2         | 4         | 6         | 6         | 9         | 6         |
| 8         | 1         | 9         | 3         | 4         | 5         | 8         | 7         |
| <u>5</u>  | <u>8</u>  | <u>3</u>  | <u>8</u>  | <u>8</u>  | <u>4</u>  | <u>7</u>  | <u>9</u>  |
| (9.)      | (10.)     | (11.)     | (12.)     | (18.)     | (14.)     | (15.)     | (16.)     |
| 41        | 72        | 56        | 37        | 58        | 76        | 72        | 83        |
| 16        | 58        | 74        | 85        | 76        | 40        | 46        | 75        |
| 24        | 19        | 10        | 42        | 32        | 38        | 19        | 64        |
| <u>33</u> | <u>30</u> | <u>49</u> | <u>17</u> | <u>49</u> | <u>9</u>  | <u>60</u> | <u>38</u> |
| (17.)     | (18.)     | (19.)     | (20.)     | (21.)     | (22.)     | (23.)     | (24.)     |
| 18        | 68        | 72        | 14        | 93        | 54        | 71        | 73        |
| 42        | 45        | 65        | 93        | 62        | 62        | 19        | 46        |
| 11        | 84        | 91        | 76        | 74        | 85        | 50        | 51        |
| <u>79</u> | <u>12</u> | <u>18</u> | <u>50</u> | <u>15</u> | <u>40</u> | <u>72</u> | <u>16</u> |

## SIMPLE ADDITION.

5

| (25.) | (26.) | (27.) | (28.) | (29.) | (30.) | (31.) | (32.) |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 62    | 81    |       |       |       |       |       |       |
| 86    | 54    | 351   | 642   | 342   | 912   | 584   | 317   |
| 94    | 37    | 486   | 317   | 809   | 341   | 718   | 862   |
| 33    | 46    | 510   | 423   | 417   | 190   | 420   | 194   |
| 52    | 39    | 136   | 186   | 153   | 617   | 703   | 706   |
|       |       |       |       |       |       |       |       |
| (33.) | (34.) | (35.) | (36.) | (37.) | (38.) |       |       |
| 485   | 62    | 9     | 147   | 609   | 789   |       |       |
| 17    | 708   | 470   | 594   | 423   | 897   |       |       |
| 934   | 390   | 58    | 46    | 48    | 978   |       |       |
| 460   | 47    | 103   | 810   | 276   | 879   |       |       |
|       |       |       |       |       |       |       |       |
| (39.) | (40.) | (41.) | (42.) | (43.) | (44.) |       |       |
|       |       |       |       | 93    | 6702  |       |       |
| 678   | 567   | 689   | 589   | 618   | 564   |       |       |
| 867   | 765   | 968   | 859   | 4192  | 83    |       |       |
| 687   | 675   | 869   | 958   | 1216  | 1709  |       |       |
| 786   | 576   | 698   | 598   | 904   | 341   |       |       |
|       |       |       |       |       |       |       |       |
| (45.) | (46.) | (47.) | (48.) | (49.) | (50.) |       |       |
| 417   | 4     | 300   |       |       |       |       |       |
| 64    | 85    | 761   | 6819  | 17    | 7621  |       |       |
| 8163  | 307   | 95    | 324   | 420   | 874   |       |       |
| 350   | 6890  | 8     | 1706  | 1608  | 19    |       |       |
| 19    | 42    | 604   | 8270  | 9743  | 3240  |       |       |

## Exercise 4.

Work the following exercises :—

- (1.)  $717 + 700 + 770 + 9 + 70.$
- (2.)  $16 + 606 + 960 + 99 + 919.$
- (3.)  $18 + 880 + 808 + 450 + 415.$
- (4.)  $903 + 13 + 30 + 67 + 666.$
- (5.)  $94 + 914 + 940 + 808 + 80.$
- (6.)  $606 + 600 + 66 + 16 + 6.$
- (7.)  $99 + 909 + 990 + 19 + 9.$
- (8.)  $976 + 607 + 77 + 17 + 700.$
- (9.)  $77 + 7 + 700 + 707 + 70.$
- (10.)  $976 + 67 + 670 + 617 + 78.$
- (11.)  $500 + 555 + 15 + 505 + 777.$
- (12.)  $64 + 604 + 640 + 88 + 18.$
- (13.)  $17 + 770 + 77 + 707 + 7.$

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- (14.)  $45 + 54 + 450 + 415 + 540.$
- (15.)  $987 + 876 + 679 + 588 + 777.$
- (16.)  $765 + 879 + 888 + 777 + 496.$
- (17.)  $668 + 788 + 949 + 868 + 796.$
- (18.)  $965 + 888 + 797 + 968 + 687.$
- (19.)  $693 + 986 + 678 + 897 + 973.$
- (20.)  $789 + 987 + 576 + 859 + 976.$
- (21.)  $88 + 880 + 18 + 8 + 808.$
- (22.)  $17 + 770 + 707 + 7 + 70.$
- (23.)  $85 + 850 + 805 + 999 + 17.$
- (24.)  $19 + 909 + 99 + 999 + 9.$
- (25.)  $45 + 54 + 450 + 514 + 44.$
- (26.)  $55 + 15 + 500 + 505 + 50.$
- (27.)  $88 + 800 + 888 + 18 + 8.$
- (28.)  $9 + 19 + 909 + 999 + 190.$
- (29.)  $66 + 606 + 16 + 666 + 6.$
- (30.)  $769 + 76 + 760 + 819 + 98$
- (31.)  $400 + 444 + 404 + 14 + 4.$
- (32.)  $46 + 406 + 908 + 77 + 770$
- (33.)  $15 + 505 + 550 + 5 + 500.$
- (34.)  $78, 87, 870 + 917 + 640.$
- (35.)  $948 + 867 + 799 + 877 + 987.$
- (36.)  $789 + 946 + 896 + 798 + 595.$
- (37.)  $967 + 845 + 988 + 777 + 666.$
- (38.)  $968 + 689 + 999 + 888 + 479.$
- (39.)  $897 + 657 + 789 + 986 + 697.$
- (40.)  $659 + 976 + 897 + 878 + 989.$
- (41.)  $66 + 606 + 666 + 16 + 600.$
- (42.)  $900 + 909 + 999 + 9 + 19.$
- (43.)  $67 + 770 + 617 + 9 + 888.$
- (44.)  $14 + 440 + 4 + 414 + 444.$
- (45.)  $17 + 7 + 770 + 707 + 777.$
- (46.)  $986 + 60 + 606 + 973 + 660.$
- (47.)  $704 + 40 + 14 + 404 + 444.$
- (48.)  $88 + 800 + 18 + 888 + 88.$
- (49.)  $66 + 660 + 16 + 600 + 6.$
- (50.)  $77 + 707 + 770 + 7 + 17.$
- (51.)  $96 + 804 + 960 + 840 + 666.$
- (52.)  $19 + 9 + 900 + 999 + 90.$
- (53.)  $88 + 800 + 8 + 880 + 18.$
- (54.)  $16 + 6 + 600 + 606 + 660.$
- (55.)  $999 + 888 + 765 + 976 + 849.$
- (56.)  $987 + 738 + 976 + 685 + 789.$
- (57.)  $848 + 867 + 988 + 779 + 888.$

(58.)  $897 + 678 + 958 + 577 + 999.$

(59.)  $976 + 567 + 789 + 987 + 796.$

(60.)  $898 + 769 + 975 + 496 + 987.$

## Exercise 5.

| (1.) | (2.) | (3.)   | (4.)   | (5.)   |
|------|------|--------|--------|--------|
| 73   | 6054 | 89,724 | 6,538  | 82,657 |
| 428  | 378  | 24,910 | 17,453 | 57,916 |
| 1867 | 4915 | 4,016  | 46     | 71,865 |
| 3905 | 3284 | 18,791 | 2,712  | 4,262  |
| 428  | 418  | 20,645 | 40,689 | 90,014 |

| (6.)   | (7.)    | (8.)    | (9.)    | (10.)   |
|--------|---------|---------|---------|---------|
| 59,386 | 36,708  | 485,719 | 46,859  | 372,946 |
| 370    | 402,917 | 84,961  | 748,608 | 4,207   |
| 12     | 348,170 | 758,412 | 91,754  | 258,681 |
| 2,694  | 13,465  | 6,827   | 106,235 | 17,954  |
| 49,057 | 150,918 | 920,418 | 2,760   | 6,047   |

| (11.)   | (12.)   | (13.)   | (14.)   | (15.)   |
|---------|---------|---------|---------|---------|
| 371,804 | 21,816  | 265     | 310,784 | 802,906 |
| 96,287  | 5,720   | 3,718   | 29,216  | 47,289  |
| 1,590   | 448,295 | 25,490  | 438,525 | 910,726 |
| 329,105 | 750,406 | 643,268 | 14,056  | 372,564 |
| 40,462  | 18,234  | 750,841 | 824,619 | 19,627  |

| (16.)   | (17.)   | (18.)   | (19.)   | (20.)   |
|---------|---------|---------|---------|---------|
| 762,916 | 14,968  | 174,839 | 908,624 | 306,728 |
| 49,287  | 872,349 | 928,385 | 567,890 | 987,645 |
| 432,806 | 419,382 | 274,942 | 321,987 | 38,928  |
| 952,478 | 785,625 | 650,098 | 654,321 | 742,085 |
| 610,539 | 43,796  | 84,627  | 879,654 | 96,727  |

| (21.)   | (22.)   | (23.)   | (24.)   | (25.)   |
|---------|---------|---------|---------|---------|
| 942,737 | 276,854 | 31,426  | 179,208 | 685,497 |
| 386,029 | 92,587  | 869,438 | 827,406 | 36,845  |
| 17,836  | 345,678 | 647,975 | 53,894  | 917,264 |
| 872,965 | 4,826   | 234,567 | 472,385 | 382,986 |
| 418,369 | 93,745  | 896,408 | 786,549 | 74,286  |
| 678,954 | 816,274 | 79,893  | 345,678 | 809,357 |

- (26.)  $1009 + 8719 + 480 + 2916 + 2073 + 951 + 6480 + 8307 + 1019 + 43 + 6810 + 375 + 4780 + 5312 + 749 + 1206.$
- (27.)  $470 + 2059 + 1783 + 8412 + 9278 + 3807 + 15 + 483 + 2506 + 8 + 39 + 484 + 607 + 1396 + 7804 + 6253.$
- (28.)  $1859 + 372 + 2408 + 7391 + 1818 + 984 + 7260 + 8459 + 2716 + 5634 + 93 + 428 + 3760 + 1918 + 156 + 8317.$
- (29.)  $1465 + 2978 + 8756 + 7309 + 5072 + 169 + 3841 + 9274 + 7835 + 172 + 8974 + 2517 + 428 + 8173 + 619 + 3760.$
- (30.)  $3204 + 8571 + 396 + 14 + 9763 + 2842 + 971 + 8309 + 2135 + 614 + 73 + 428 + 1867 + 3905 + 428 + 6054 + 378 + 4915 + 3284 + 418.$
- (31.)  $24910 + 4016 + 18791 + 20645 + 17453 + 46 + 2712 + 40689 + 57916 + 71865 + 4262 + 90014 + 370 + 12 + 2694 + 49057.$
- (32.)  $402917 + 348170 + 13465 + 150918 + 84961 + 758412 + 6827 + 920418 + 748608 + 91754 + 106235 + 2760 + 4207 + 258681 + 17954 + 6047.$
- (33.)  $40462 + 329105 + 1590 + 96287 + 371804 + 21816 + 5720 + 448295 + 750406 + 18234 + 265 + 3718 + 25490 + 643268 + 750841 + 310784 + 29216 + 438525 + 14056 + 824619.$

Add together

- (34.) 802906, 762916, 14968, 47289, 49287, 872349, 910726, 432806, 419382, 272564, 952478, 785625, 19627, 610539, and 43796.
- (35.) 84627, 879654, 96727, 742085, 654321, 650098, 274942, 321987, 38928, 987645, 567890, 928385, 174839, 908624, and 306728.
- (36.) 678954, 418369, 872965, 4826, 93745, 816274, 234567, 896408, 79893, 17836, 386029, 942737, 276854, 92587, 345678, 31426, 869438, and 647975.

### Exercise 6.

- (1.) Find the sum of four hundred and fifty-one, two thousand eight hundred and six, four thousand and ninety-three, and six thousand two hundred and seventy.
- (2.) Find the sum of seven hundred and sixty-three, two thousand and seventeen, five thousand four hundred and fifty, and six thousand three hundred and nine.
- (3.) Find the sum of six thousand four hundred and sixty-three, one hundred and ninety-six, forty-seven, two thousand three hundred and eighty.

- (4.) Find the sum of two hundred and forty-seven, two thousand nine hundred and eighteen, ninety-four, and four thousand six hundred and forty-seven.
- (5.) Find the sum of nine thousand one hundred and forty-five, four hundred and thirty-six, two thousand one hundred and seventy-two, and nine.
- (6.) Find the sum of three thousand three hundred and thirty, four hundred and eight, two thousand one hundred and ninety-seven, and six thousand four hundred and five.
- (7.) Find the sum of four thousand and forty-two, seven hundred and thirty-six, six thousand nine hundred and eighty-two, and nine.
- (8.) Find the sum of seven thousand and eighteen, eight hundred and ninety, six thousand seven hundred and fifty-two, and five thousand two hundred and seventy-four.
- (9.) Find the sum of seventeen, nine thousand eight hundred and sixty, one thousand and twenty-four, and eight thousand six hundred and five.
- (10.) Find the sum of three thousand seven hundred and twelve, four thousand and ninety-three, eight hundred and seventy, and nine thousand two hundred and six.
- (11.) Add together three thousand four hundred and eighty-six, seven thousand two hundred and ten, six hundred and eighty-one, nine thousand six hundred and fifty-four.
- (12.) Add together one thousand eight hundred and ninety-six, seven hundred and twenty-three, three thousand two hundred and sixty-seven, five hundred and forty-eight.
- (13.) Add together eight thousand nine hundred and sixty-five, six hundred and forty-three, sixty-two, and eight thousand two hundred and seventeen.
- (14.) Add together three thousand six hundred and seventy-four, eight hundred and thirty-five, five thousand four hundred and twenty-six, and three thousand six hundred and eighty-seven.
- (15.) Add together four hundred and eighty-five, five thousand and thirty-nine, eight hundred and seventy-one, and six thousand and eighteen.

- (86) 1000 + 8710 + 480 + 2016 + 8073 + 861 + 8480 + 8807 + 1019  
+ 43 + 8810 + 876 + 4789 + 6813 + 740 + 1300
- (87) 470 + 2050 + 1783 + 8413 + 8278 + 8807 + 16 + 488 + 8816  
+ 8 + 80 + 484 + 807 + 1800 + 7804 + 8868.
- (88) 1600 + 373 + 2408 + 7301 + 1818 + 884 + 7300 + 8450 + 8718  
+ 6684 + 103 + 428 + 8780 + 1018 + 168 + 8817.
- (89) 1466 + 2078 + 8766 + 7300 + 16072 + 180 + 8841 + 8874  
+ 7886 + 173 + 8074 + 8617 + 438 + 8178 + 810 + 8789.
- (90) 8204 + 8671 + 306 + 14 + 8788 + 2842 + 871 + 8809 + 8136  
+ 614 + 78 + 428 + 1807 + 8800 + 438 + 8064 + 878 + 4016  
+ 8284 + 418.
- (91) 34010 + 4010 + 18701 + 30846 + 17468 + 48 + 8713 + 40380  
+ 67018 + 71866 + 42082 + 80014 + 870 + 13 + 2804 + 40067.
- (92) 402017 + 848170 + 18466 + 160818 + 84061 + 768412 + 8827  
+ 830418 + 748808 + 81764 + 108286 + 8789 + 4807  
+ 268081 + 17064 + 6917.
- (93) 40482 + 88010 + 1600 + 88287 + 871804 + 81816 + 6780  
+ 448300 + 750408 + 18234 + 886 + 8718 + 88400 + 848868  
+ 760841 + 810784 + 20218 + 488666 + 14066 + 884670.

Add together

- (94) 808000, 783016, 14068, 47880, 40387, 873840, 810780,  
488608, 4103862, 872864, 862478, 788666, 10637, 810630,  
and 43700.
- (95) 84827, 870664, 89787, 748066, 861821, 880008, 874048,  
831087, 88028, 887046, 687800, 828386, 174880, 808034,  
and 808788.
- (96) 878064, 418300, 872806, 4826, 88746, 810274, 834567,  
886408, 70608, 17888, 880030, 812787, 878864, 88667,  
846878, 81428, 880488, and 847076.

### Mazeoline 4.

- (a) Find the sum of four hundred and fifty one, two thousand eight hundred and six, four thousand and ninety three and six thousand two hundred and seventy.
- (b) Find the sum of seven hundred and sixty three, six thousand and seventeen, five thousand four hundred and fifty, and six thousand three hundred and nine.
- (c) Find the sum of six thousand four hundred and six, one hundred and ninety six, forty seven, thousand three hundred and eighty.

- (4.) Find the sum of two hundred and forty-seven, two thousand nine hundred and eighteen, ninety-four, and four thousand six hundred and forty-seven.
- (5.) Find the sum of nine thousand one hundred and forty-five, four hundred and thirty-six, two thousand one hundred and seventy-two, and nine.
- (6.) Find the sum of three thousand three hundred and thirty, four hundred and eight, two thousand one hundred and ninety-seven, and six thousand four hundred and five.
- (7.) Find the sum of four thousand and forty-two, seven hundred and thirty-six, six thousand nine hundred and eighty-two, and nine.
- (8.) Find the sum of seven thousand and eighteen, eight hundred and ninety, six thousand seven hundred and fifty-two, and five thousand two hundred and seventy-four.
- (9.) Find the sum of seventeen, nine thousand eight hundred and sixty, one thousand and twenty-four, and eight thousand six hundred and five.
- (10.) Find the sum of three thousand seven hundred and twelve, four thousand and ninety-three, eight hundred and seventy, and nine thousand two hundred and six.
- (11.) Add together three thousand four hundred and eighty-six, seven thousand two hundred and ten, six hundred and eighty-one, nine thousand six hundred and fifty-four.
- (12.) Add together one thousand eight hundred and ninety-six, seven hundred and twenty-three, three thousand two hundred and sixty-seven, five hundred and forty-eight.
- (13.) Add together eight thousand nine hundred and sixty-five, six hundred and forty-three, sixty-two, and eight thousand two hundred and seventeen.
- (14.) Add together three thousand six hundred and seventy-four, eight hundred and thirty-five, five thousand four hundred and twenty-six, and three thousand six hundred and eighty-seven.
- (15.) Add together four hundred and eighty-five, five thousand and thirty-nine, eight hundred and seventy-one, and six thousand and eighteen.

- (26.)  $1009 + 8719 + 480 + 2916 + 2073 + 951 + 6480 + 8207 + 1019 + 43 + 6810 + 375 + 4780 + 5312 + 749 + 1906.$
- (27.)  $470 + 2050 + 1783 + 8412 + 9278 + 3807 + 15 + 483 + 2506 + 8 + 30 + 484 + 807 + 1396 + 7804 + 6253.$
- (28.)  $1859 + 372 + 2408 + 7301 + 1818 + 984 + 7260 + 8459 + 2716 + 5634 + 93 + 428 + 2760 + 1918 + 156 + 8317.$
- (29.)  $1465 + 2978 + 8756 + 7309 + 5072 + 169 + 3841 + 9274 + 7836 + 172 + 8074 + 2617 + 428 + 8173 + 619 + 3760.$
- (30.)  $3204 + 8571 + 396 + 14 + 9762 + 2842 + 971 + 8309 + 2136 + 614 + 73 + 428 + 1807 + 3905 + 428 + 6054 + 378 + 4915 + 3284 + 418.$
- (31.)  $24910 + 4016 + 18701 + 20845 + 17453 + 46 + 2712 + 40699 + 57916 + 71865 + 4262 + 90014 + 370 + 12 + 2694 + 49057.$
- (32.)  $402917 + 348170 + 13465 + 150018 + 84061 + 758412 + 6827 + 920418 + 74808 + 91754 + 106235 + 2760 + 4307 + 258681 + 17954 + 6047.$
- (33.)  $40462 + 329105 + 1590 + 96287 + 371804 + 21816 + 5790 + 448295 + 750406 + 18234 + 265 + 3718 + 25490 + 643268 + 750841 + 310784 + 29216 + 438625 + 14056 + 824619.$

Add together

- (34.) 802006, 762916, 14968, 47289, 49287, 872349, 910726, 432806, 419382, 272564, 952478, 785625, 19627, 610539, and 43706.
- (35.) 84627, 870654, 96727, 742085, 654221, 650098, 274942, 321987, 38928, 087645, 567800, 028385, 174839, 908624, and 306728.
- (36.) 678954, 418369, 872965, 4826, 93745, 816274, 234567, 896408, 79803, 17836, 386029, 942737, 270854, 92587, 345678, 31426, 869438, and 647975.

### Exercise 6.

- (1.) Find the sum of four hundred and fifty-one, two thousand eight hundred and six, four thousand and ninety-three, and six thousand two hundred and seventy.
- (2.) Find the sum of seven hundred and sixty-three, two thousand and seventeen, five thousand four hundred and fifty, and six thousand three hundred and nine.
- (3.) Find the sum of six thousand four hundred and sixty-three, one hundred and ninety-six, forty-seven, two thousand three hundred and eighty.

|                |                |                |                |                |              |
|----------------|----------------|----------------|----------------|----------------|--------------|
| (7.)           | (8.)           | (9.)           | (10.)          | (11.)          | (12.)        |
| 8910           | 4760           | 6374           | 3003           | 6850           | 4004         |
| <u>3204</u>    | <u>1076</u>    | <u>1485</u>    | <u>303</u>     | <u>1295</u>    | <u>440</u>   |
| (13.)          | (14.)          | (15.)          | (16.)          | (17.)          | (18.)        |
| 3826           | 9271           | 6119           | 7208           | 1054           | 9270         |
| <u>1836</u>    | <u>790</u>     | <u>5911</u>    | <u>2975</u>    | <u>845</u>     | <u>2807</u>  |
| (19.)          | (20.)          | (21.)          | (22.)          | (23.)          | (24.)        |
| 7009           | 1207           | 12,670         | 17,006         | 18,409         | 10,704       |
| <u>2049</u>    | <u>1176</u>    | <u>5,209</u>   | <u>8,271</u>   | <u>6,854</u>   | <u>8,290</u> |
| (25.)          | (26.)          | (27.)          | (28.)          | (29.)          | (30.)        |
| 18,404         | 31,403         | 40,912         | 52,712         | 39,407         | 70,012       |
| <u>8,670</u>   | <u>12,014</u>  | <u>8,276</u>   | <u>19,071</u>  | <u>10,961</u>  | <u>9,270</u> |
| (31.)          | (32.)          | (33.)          | (34.)          | (35.)          |              |
| 420,964        | 123,954        | 610,407        | 207,063        | 783,948        |              |
| <u>108,206</u> | <u>104,283</u> | <u>508,212</u> | <u>107,408</u> | <u>178,266</u> |              |
| (36.)          | (37.)          | (38.)          | (39.)          | (40.)          |              |
| 400,212        | 271,909        | 100,000        | 326,408        | 960,418        |              |
| <u>85,017</u>  | <u>46,317</u>  | <u>90,019</u>  | <u>109,074</u> | <u>109,654</u> |              |

(41.) From 402,917 take 348,170.

(42.) " 748,608 " 91,754.

(43.) " 106,235 " 2,760.

(44.) " 371,804 " 96,287.

(45.) " 329,105 " 40,462.

(46.) " 21,816 " 5,720.

(47.) " 750,406 " 18,234.

(48.) " 310,784 " 29,216.

(49.) " 438,525 " 14,056.

(50.) " 900,888 " 80,099.

(51.) Take 908,207 from 14,019,609.

(52.) " 2,627,809 " 8,200,071.

(53.) " 10,907,660 " 80,504,009.

(54.) " 73,260,917 " 76,018,088.

(55.) " 8,909,770 " 10,300,604.

(56.) " 72,345,678 " 80,234,567.

(57.) " 92,092,992 " 93,993,090.

(58.) " 8,307,458 " 10,018,909.

(59.) " 64,292,078 " 70,014,201.

(60.) " 15,307,245 " 50,705,082.

- (10.) There are 144 pens in a box : how many will be left when the teacher has given out six dozen ?
- (11.) A butcher bought 50 sheep : he sold 6, and killed 36 : how many are left ?
- (12.) What is the difference between the rents of two houses, one of which lets for 30 pounds a year, and the other for 18 pounds a half-year ?
- (13.) Three boys went fishing, and each caught seven fish : how many did they get altogether ?
- (14.) In a cricket match one side made 87 runs, but was beaten by 13 : how many runs did the other side make ?
- (15.) There are 60 children in a school : 13 are infants, and 23 are girls : how many boys are there ?
- (16.) A man died at the age of 77 years, having been married 39 years : how old was he when he married ?
- (17.) Napoleon was born in 1769, and died in 1821 : how long did he live ?
- (18.) A farmer had 450 sheep : he sold 124 at one time, and 126 at another : how many had he left ?

## SIMPLE MULTIPLICATION.

MULTIPLICATION is a short way of finding what a given number will amount to, when repeated a certain number of times.

The number to be repeated is called the *Multiplicand*, and the number which shows how often it is to be repeated is called the *Multiplier*. The answer which is obtained by multiplying the two numbers together is called the *Product*. The Multiplicand and Multiplier are the Factors of the Product.

The sign of Multiplication is  $\times$ , thus  $5 \times 8 = 40$  means that 5 multiplied by 8 gives a product of 40.

Proof :—Take the Multiplier as Multiplicand, and the Multiplicand as Multiplier, and if the same product is obtained as before, the answer is correct.

Example 1.       $596,734$  *Multiplicand.*  
                         $7$  *Multiplier.*

*Ans.*  $4,177,138$  *Product.*

Example 2.

3,721 *Multiplicand.*  
 243 *Multiplier.*

$$\underline{11163}$$

$$\underline{14884}$$

$$\underline{7442}$$

*Ans.* 904203 *Product.*

Care should be taken to place the units, tens, hundreds, etc., of the Multiplier respectively under the units, tens, hundreds, etc., of the Multiplicand. In Long Multiplication each line of products should commence *exactly* below the figure in the Multiplier which produces it.

## Exercise 12.

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| (1.)     | (2.)     | (3.)     | (4.)     | (5.)     | (6.)     |
| 4123     | 5302     | 6143     | 7432     | 8041     | 9234     |
| <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> |
| (7.)     | (8.)     | (9.)     | (10.)    | (11.)    | (12.)    |
| 13207    | 643218   | 931840   | 375026   | 487613   | 567890   |
| <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> | <u>2</u> |
| (13.)    | (14.)    | (15.)    | (16.)    | (17.)    | (18.)    |
| 4231     | 5123     | 6003     | 7304     | 8132     | 9062     |
| <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> |
| (19.)    | (20.)    | (21.)    | (22.)    | (23.)    | (24.)    |
| 327809   | 178360   | 297008   | 736019   | 546809   | 987654   |
| <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> | <u>3</u> |
| (25.)    | (26.)    | (27.)    | (28.)    | (29.)    | (30.)    |
| 4120     | 3524     | 4605     | 7316     | 8700     | 9067     |
| <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> |
| (31.)    | (32.)    | (33.)    | (34.)    | (35.)    | (36.)    |
| 738059   | 604789   | 326180   | 849217   | 938006   | 456789   |
| <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> | <u>4</u> |
| (37.)    | (38.)    | (39.)    | (40.)    | (41.)    | (42.)    |
| 3210     | 4132     | 5214     | 6053     | 7165     | 8009     |
| <u>5</u> | <u>5</u> | <u>5</u> | <u>5</u> | <u>5</u> | <u>5</u> |
| (880)    |          |          |          |          |          |

|        |        |         |        |         |         |
|--------|--------|---------|--------|---------|---------|
| (43.)  | (44.)  | (45.)   | (46.)  | (47.)   | (48.)   |
| 370872 | 910736 | 800792  | 432567 | 198650  | 567890  |
| 5      | 5      | 5       | 5      | 5       | 5       |
| (49.)  | (50.)  | (51.)   | (52.)  | (53.)   | (54.)   |
| 3201   | 4123   | 5230    | 6314   | 7045    | 9368    |
| 6      | 6      | 6       | 6      | 6       | 6       |
| (55.)  | (56.)  | (57.)   | (58.)  | (59.)   | (60.)   |
| 430619 | 861238 | 700140  | 532194 | 329760  | 987654  |
| 6      | 6      | 6       | 6      | 6       | 6       |
| (61.)  | (62.)  | (63.)   | (64.)  | (65.)   | (66.)   |
| 760158 | 396421 | 908476  | 863470 | 863281  | 84162   |
| 7      | 7      | 7       | 7      | 7       | 7       |
| (67.)  | (68.)  | (69.)   | (70.)  | (71.)   | (72.)   |
| 934157 | 602384 | 87634   | 902184 | 39605   | 960584  |
| 7      | 7      | 7       | 7      | 7       | 7       |
| (73.)  | (74.)  | (75.)   | (76.)  | (77.)   | (78.)   |
| 31450  | 60237  | 92074   | 59648  | 65728   | 53946   |
| 8      | 8      | 8       | 8      | 8       | 8       |
| (79.)  | (80.)  | (81.)   | (82.)  | (83.)   | (84.)   |
| 68492  | 793405 | 96748   | 481769 | 3785604 | 9706548 |
| 8      | 8      | 8       | 8      | 8       | 8       |
| (85.)  | (86.)  | (87.)   | (88.)  | (89.)   | (90.)   |
| 5134   | 60327  | 78046   | 970216 | 392684  | 473892  |
| 9      | 9      | 9       | 9      | 9       | 9       |
| (91.)  | (92.)  | (93.)   | (94.)  | (95.)   | (96.)   |
| 876943 | 783054 | 917865  | 573096 | 786412  | 319765  |
| 9      | 9      | 9       | 9      | 9       | 9       |
| (97.)  | (98.)  | (99.)   | (100.) | (101.)  | (102.)  |
| 682739 | 862937 | 682709  | 827968 | 593807  | 326934  |
| 10     | 10     | 11      | 11     | 11      | 11      |
| (103.) | (104.) | (105.)  | (106.) | (107.)  | (108.)  |
| 396827 | 739086 | 5398067 | 826738 | 3908627 | 3960827 |
| 12     | 12     | 12      | 12     | 12      | 12      |

| (109.) | (110.)  | (111.) | (112.) | (113.) | (114.) |
|--------|---------|--------|--------|--------|--------|
| 573826 | 8629384 | 396827 | 908073 | 687598 | 529087 |

12                    12                    12                    12                    12                    12

## Exercise 13.

- |                             |                               |
|-----------------------------|-------------------------------|
| (1.) 27,419 × 6, 9, and 11. | (11.) 183,942 × 4, 7, and 10. |
| (2.) 84,365 × 5, 7, " 9.    | (12.) 370,418 × 9, 11, " 3.   |
| (3.) 19,048 × 7, 10, " 12.  | (13.) 842,923 × 11, 12, " 5.  |
| (4.) 46,317 × 10, 11, " 12. | (14.) 219,486 × 7, 8, " 11.   |
| (5.) 68,705 × 8, 5, " 9.    | (15.) 738,924 × 6, 9, " 12.   |
| (6.) 72,816 × 9, 10, " 12.  | (16.) 124,309 × 12, 3, " 5.   |
| (7.) 12,483 × 12, 4, " 9.   | (17.) 293,678 × 5, 7, " 9.    |
| (8.) 91,706 × 11, 12, " 8.  | (18.) 517,462 × 8, 10, " 12.  |
| (9.) 40,615 × 4, 6, " 8.    | (19.) 263,971 × 10, 11, " 7.  |
| (10.) 36,948 × 6, 9, " 11.  | (20.) 843,467 × 12, 10, " 11. |

- (21.) Multiply twenty thousand four hundred and ninety by eleven.
- (22.) Multiply three hundred and forty thousand and seventy-one by two.
- (23.) Multiply seven hundred and sixty thousand eight hundred and ninety-two by four.
- (24.) Find the value of nine hundred and seventy-six thousand two hundred and thirty multiplied by five.
- (25.) Multiply four hundred and seventy-three thousand one hundred and twenty-six by nine.
- (26.) Find the amount of six times 190,629.
- (27.) Multiply seventy-two thousand four hundred and ninety-three by eight.
- (28.) What do nine times 78,265 amount to?
- (29.) Multiply forty-six thousand nine hundred and thirty-eight by seven.
- (30.) Multiply thirty-four thousand and seventy-five by six.

## Exercise 14.

Find the product of

- |                                 |                                 |
|---------------------------------|---------------------------------|
| (1.) 379,068 and 56 by factors. | (5.) 396,087 and 27 by factors. |
| (2.) 239,682 " 70 " "           | (6.) 368,592 " 45 "             |
| (3.) 682,739 " 84 " "           | (7.) 129,683 " 80 "             |
| (4.) 368,793 " 42 " "           | (8.) 273,629 " 18 "             |

|  |                              |
|--|------------------------------|
| (9.) 539,279 and 63 by factors.            | (15.) 873,938 and 36 by fac- |
| (10.) 372,846 " 132 " (16.) 626,739 " 40 " |                              |
| (11.) 296,087 " 110 " (17.) 582,396 " 77 " |                              |
| (12.) 439,682 " 44 " (18.) 827,968 " 108 " |                              |
| (13.) 739,826 " 64 " (19.) 739,827 " 121 " |                              |
| (14.) 593,426 " 28 " (20.) 628,938 " 144 " |                              |

Also work out the above exercises by Long Multiplication.

### Exercise 15.

- (1-6.)  $790,864 \times 79$ , 86, 39, 57, 76, 38.  
 (7-12.)  $590,076 \times 82$ , 39, 57, 68, 95, 67.  
 (13-18.)  $209,768 \times 79$ , 83, 69, 78, 54, 58.  
 (19-24.)  $54,079 \times 69$ , 38, 75, 76, 59, 37.  
 (25-30.)  $82,008 \times 79$ , 63, 80, 78, 24, 69.  
 (31-36.)  $29,763 \times 40$ , 82, 79, 57, 63, 89.  
 (37-42.)  $73,868 \times 29$ , 37, 70, 96, 25, 58.  
 (43-48.)  $93,076 \times 80$ , 72, 39, 47, 56, 78.  
 (49-54.)  $29,763 \times 82$ , 73, 90, 86, 95, 83.  
 (55-60.)  $392,079 \times 80$ , 79, 63, 84, 95, 72.

### Exercise 16.

Work the following :

|                                  |                               |
|----------------------------------|-------------------------------|
| (1.) $34,732 \times 14$ and 42.  | (21.) $47,696 \times 144$ and |
| (2.) $56,784 \times 24$ " 36.    | (22.) $560,341 \times 304$ "  |
| (3.) $34,075 \times 36$ " 68.    | (23.) $243,042 \times 265$ "  |
| (4.) $177,242 \times 19$ " 57.   | (24.) $45,678 \times 333$ "   |
| (5.) $1,429,689 \times 55$ " 89. | (25.) $202,842 \times 342$ "  |
| (6.) $364,111 \times 56$ " 84.   | (26.) $37,896 \times 149$ "   |
| (7.) $78,540 \times 95$ " 76.    | (27.) $31,416 \times 175$ "   |
| (8.) $79,419 \times 17$ " 85.    | (28.) $40,930 \times 779$ "   |
| (9.) $26,517 \times 45$ " 67.    | (29.) $291,042 \times 125$ "  |
| (10.) $108,336 \times 58$ " 87.  | (30.) $46,938 \times 576$ "   |
| (11.) $209,402 \times 72$ " 36.  | (31.) $78,265 \times 369$ "   |
| (12.) $342,516 \times 58$ " 84.  | (32.) $72,493 \times 865$ "   |
| (13.) $764,131 \times 48$ " 96.  | (33.) $47,368 \times 549$ "   |
| (14.) $783,473 \times 42$ " 63.  | (34.) $72,594 \times 358$ "   |
| (15.) $72,594 \times 85$ " 98.   | (35.) $227,351 \times 429$ "  |
| (16.) $47,368 \times 95$ " 76.   | (36.) $58,212 \times 481$ "   |
| (17.) $88,621 \times 38$ " 57.   | (37.) $564,120 \times 140$ "  |
| (18.) $234,657 \times 16$ " 64.  | (38.) $87,063 \times 607$ "   |
| (19.) $420,956 \times 73$ " 49.  | (39.) $426,917 \times 384$ "  |
| (20.) $746,291 \times 39$ " 52.  | (40.) $827,396 \times 709$ "  |

Find the product of :

|                    |                          |
|--------------------|--------------------------|
| .) 57,064 and 625. | (46.) 430,605 and 4,005. |
| .) 36,204 " 306.   | (47.) 935,867 " 560.     |
| .) 302,076 " 603.  | (48.) 796,834 " 470.     |
| .) 47,672 " 234.   | (49.) 290,361 " 30,406.  |
| .) 73,008 " 2,036. | (50.) 579,862 " 90,008.  |

### Exercise 17.

- Find the product of 287 and 156.
- Multiply six thousand two hundred and fifty-seven by 42.
- What do 53 times eight thousand one hundred and sixty-four amount to ?
- Multiply four million five hundred and sixty-seven thousand and thirty-one by one hundred and forty-seven.
- Multiply four millions nine hundred and five thousand six hundred and four by 263.
- Multiply eighty thousand four hundred and sixty-seven by nine hundred and seventy-six.
- Multiply together two thousand four hundred and seventy-three and five thousand and eight.
- A book has four hundred and seven pages : how many pages are there in seven hundred and fifty such books ?
- If a garrison of soldiers eat five thousand seven hundred and eighty-nine pounds of bread a day, how much will be required for 287 days ?
- Suppose a man travels one hundred and five miles a day, how far will he travel in two hundred and forty-six days ?
- There were one hundred and twenty-six bales of cotton in a ship, and each bale weighed five hundred and seventy-two pounds. Find the whole weight of cotton.
- Multiply one million two hundred and forty-six thousand eight hundred and fifty-three by nine thousand and seven.
- Multiply forty thousand nine hundred and thirty by seven hundred and seventy-nine.
- Find the product of fifteen thousand six hundred and seven and three thousand and ninety-four.

- (15.) Multiply one million nine hundred thousand seven hundred and thirty-one by four thousand and six.
- (16.) Multiply five hundred and seventy thousand four hundred and ninety-two by seven thousand nine hundred and eighty-five.
- (17.) Find the product of two hundred and thirty-seven thousand nine hundred and fifty and six hundred and forty.
- (18.) Multiply together eighty-seven, fifty-six, and four hundred and nine.
- (19.) Find the product of seventeen thousand nine hundred and forty-three and five thousand and seventy-nine.
- (20.) Multiply two hundred and thirty-seven thousand and sixty by seventeen thousand and eighty-one.
- (21.) If a garrison of soldiers eat 5789 pounds of bread a day, how much will be required for 287 days?
- (22.) If a man travels 105 miles a day, how far will he travel in 246 days?
- (23.) Find the product of fifteen thousand six hundred and seven and three thousand and ninety-four.
- (24.) There are 12 pence in a shilling : how many pence are there in 98,630 shillings?
- (25.) A mile contains 1760 yards : how many yards are there in 402 miles?
- (26.) A man walks 60 miles a day : how far would he go in a fortnight (not counting Sundays)?
- (27.) Multiply forty thousand nine hundred and thirty by seven hundred and seventy-nine.
- (28.) A train goes 196 miles a day : how far would it run in a year (365 days)?
- (29.) How many men are there in seventeen regiments with 806 men in each?
- (30.) How many are seventeen thousand nine hundred and forty-three times five thousand and seventy-nine.

### SIMPLE DIVISION.

Division is the method of finding how often one number called the *Divisor* is contained in another called the *Dividend*. The result which is obtained is called the *Quotient*. If the

If the Divisor be not contained in the Dividend an exact number of times, the number remaining is called the *Remainder*.

The sign of Division is  $\div$ , thus  $12 \div 4 = 3$ .

1°. When the Divisor does not exceed 12 the operation is termed *Short Division*.

Example.

$$9) \underline{234768}$$

Quotient. 26085 + 3 Remainder.

In this case the Quotient is placed *below* the Dividend.

Proof for Division :—Multiply the Quotient by the Divisor, and add the Remainder, if any, to the Product. If the result is the same as the Dividend, the answer is correct.

### Exercise 18.

Work the following :

|                            |                            |                            |                            |                           |
|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| (1.)<br>2 ) <u>48206</u>   | (2.)<br>2 ) <u>86042</u>   | (3.)<br>2 ) <u>68476</u>   | (4.)<br>2 ) <u>621978</u>  | (5.)<br>2 ) <u>64586</u>  |
| (6.)<br>3 ) <u>39630</u>   | (7.)<br>3 ) <u>96012</u>   | (8.)<br>3 ) <u>63459</u>   | (9.)<br>3 ) <u>97263</u>   | (10.)<br>3 ) <u>67584</u> |
| (11.)<br>4 ) <u>48064</u>  | (12.)<br>4 ) <u>89228</u>  | (13.)<br>4 ) <u>84096</u>  | (14.)<br>4 ) <u>45224</u>  | (15.)<br>4 ) <u>48052</u> |
| (16.)<br>5 ) <u>57075</u>  | (17.)<br>5 ) <u>65425</u>  | (18.)<br>5 ) <u>70460</u>  | (19.)<br>5 ) <u>57560</u>  | (20.)<br>5 ) <u>75650</u> |
| (21.)<br>6 ) <u>90867</u>  | (22.)<br>6 ) <u>80993</u>  | (23.)<br>6 ) <u>89680</u>  | (24.)<br>6 ) <u>97841</u>  |                           |
| (25.)<br>6 ) <u>93074</u>  | (26.)<br>6 ) <u>70946</u>  | (27.)<br>6 ) <u>80937</u>  | (28.)<br>6 ) <u>97864</u>  |                           |
| (29.)<br>7 ) <u>49714</u>  | (30.)<br>7 ) <u>364847</u> | (31.)<br>7 ) <u>569163</u> | (32.)<br>7 ) <u>345926</u> |                           |
| (33.)<br>7 ) <u>832967</u> | (34.)<br>7 ) <u>539682</u> | (35.)<br>7 ) <u>829673</u> | (36.)<br>7 ) <u>293687</u> |                           |
| (37.)<br>8 ) <u>89616</u>  | (38.)<br>8 ) <u>192064</u> | (39.)<br>8 ) <u>735968</u> | (40.)<br>8 ) <u>293684</u> |                           |
| (41.)<br>8 ) <u>396827</u> | (42.)<br>8 ) <u>324069</u> | (43.)<br>8 ) <u>207693</u> | (44.)<br>8 ) <u>201768</u> |                           |

|                              |                             |                             |                             |
|------------------------------|-----------------------------|-----------------------------|-----------------------------|
| <u>(45.)</u><br>9 ) 288159   | <u>(46.)</u><br>9 ) 368279  | <u>(47.)</u><br>9 ) 837684  | <u>(48.)</u><br>9 ) 207834  |
| <u>(49.)</u><br>9 ) 368279   | <u>(50.)</u><br>9 ) 298736  | <u>(51.)</u><br>9 ) 829634  | <u>(52.)</u><br>9 ) 827394  |
| <u>(53.)</u><br>10 ) 739680  | <u>(54.)</u><br>10 ) 296834 | <u>(55.)</u><br>10 ) 827368 | <u>(56.)</u><br>10 ) 392768 |
| <u>(57.)</u><br>11 ) 396825  | <u>(58.)</u><br>11 ) 829346 | <u>(59.)</u><br>11 ) 862973 | <u>(60.)</u><br>11 ) 326845 |
| <u>(61.)</u><br>11 ) 327396  | <u>(62.)</u><br>11 ) 190101 | <u>(63.)</u><br>11 ) 201901 | <u>(64.)</u><br>11 ) 839607 |
| <u>(65.)</u><br>12 ) 908676  | <u>(66.)</u><br>12 ) 396827 | <u>(67.)</u><br>12 ) 682935 | <u>(68.)</u><br>12 ) 372968 |
| <u>(69.)</u><br>12 ) 3968275 | <u>(70.)</u><br>12 ) 608079 | <u>(71.)</u><br>12 ) 308695 | <u>(72.)</u><br>12 ) 732968 |

|  |                                  |
|--|----------------------------------|
| <u>(73.) Divide 87,647 by 7 and 9.</u> | <u>(87) 394,064 ÷ 11 and 5.</u>  |
| <u>(74.)</u> " 94,328 " 8 " 10.        | <u>(88) 1,084,608 ÷ 12 " 3.</u>  |
| <u>(75.)</u> " 43,272 " 9 " 12.        | <u>(89) 1,109,964 ÷ 12 " 7.</u>  |
| <u>(76.)</u> " 377,424 " 6 " 8.        | <u>(90) 1,018,193 ÷ 11 " 9.</u>  |
| <u>(77.)</u> " 975,216 " 8 " 9.        | <u>(91) 1,198,872 ÷ 12 " 10.</u> |
| <u>(78.)</u> " 463,750 " 7 " 11.       | <u>(92) 1,073,285 ÷ 10 " 12.</u> |
| <u>(79.)</u> " 4,763,025 " 9 " 12.     | <u>(93) 377,424 ÷ 9 " 12.</u>    |
| <u>(80.)</u> " 4,200,560 " 7 " 10.     | <u>(94) 510,384 ÷ 7 " 11.</u>    |
| <u>(81.)</u> " 7,200,045 " 9 " 6.      | <u>(95) 4,763,025 ÷ 8 " 12.</u>  |
| <u>(82.)</u> " 4,704,091 " 7 " 5.      | <u>(96) 4,200,560 ÷ 7 " 11.</u>  |
| <u>(83.)</u> " 730,490 " 5 " 9.        | <u>(97) 7,200,045 ÷ 9 " 7.</u>   |
| <u>(84.)</u> " 510,384 " 7 " 11.       | <u>(98) 4,704,091 ÷ 7 " 10.</u>  |
| <u>(85.)</u> " 6,003,424 " 8 " 6.      | <u>(99) 6,900,874 ÷ 11 " 12.</u> |
| <u>(86.)</u> " 3,627,089 " 6 " 12.     | <u>(100) 1,234,567 ÷ 9 " 7.</u>  |

2°. When the Divisor exceeds 12 and can be resolved into two factors, each of which is less than 12, the operation can be performed as follows :—

$$42 \left| \begin{array}{l} 6 \quad 347,829 \div 42 \\ 7 \quad \overline{57,971 + 3} \\ \hline 8,281 + 4 \end{array} \right\} 27 \text{ Remainder.}$$

Quotient.

The true remainder, in this case, is obtained by the following rule :—Multiply the second remainder by the first divisor, and add in the first remainder.

## Exercise 19.

Work the following Exercises (using factors) :—

- |       |                      |       |                         |
|-------|----------------------|-------|-------------------------|
| (1.)  | 161,700 $\div$ 15.   | (21.) | 48,735,679 $\div$ 48.   |
| (2.)  | 178,464 $\div$ 16.   | (22.) | 10,734,857 $\div$ 56.   |
| (3.)  | 301,147 $\div$ 63.   | (23.) | 32,905,866 $\div$ 42.   |
| (4.)  | 765,431 $\div$ 96.   | (24.) | 68,340,000 $\div$ 18.   |
| (5.)  | 300,049 $\div$ 22.   | (25.) | 20,127,072 $\div$ 96.   |
| (6.)  | 816,751 $\div$ 18.   | (26.) | 74,307,926 $\div$ 25.   |
| (7.)  | 296,581 $\div$ 49.   | (27.) | 14,986,728 $\div$ 72.   |
| (8.)  | 585,900 $\div$ 27.   | (28.) | 31,339,213 $\div$ 64.   |
| (9.)  | 385,524 $\div$ 36.   | (29.) | 54,019,350 $\div$ 110.  |
| (10.) | 108,750 $\div$ 25.   | (30.) | 21,917,040 $\div$ 120.  |
| (11.) | 1,276,704 $\div$ 42. | (31.) | 308,479,651 $\div$ 49.  |
| (12.) | 1,193,288 $\div$ 45. | (32.) | 882,330,260 $\div$ 70.  |
| (13.) | 1,089,675 $\div$ 36. | (33.) | 480,296,447 $\div$ 100. |
| (14.) | 8,349,761 $\div$ 42. | (34.) | 108,038,700 $\div$ 55.  |
| (15.) | 3,180,074 $\div$ 56. | (35.) | 264,770,354 $\div$ 108. |
| (16.) | 9,516,783 $\div$ 64. | (36.) | 584,199,372 $\div$ 110. |
| (17.) | 7,596,741 $\div$ 48. | (37.) | 372,480,977 $\div$ 120. |
| (18.) | 7,590,000 $\div$ 84. | (38.) | 704,694,189 $\div$ 121. |
| (19.) | 9,008,967 $\div$ 96. | (39.) | 114,518,910 $\div$ 132. |
| (20.) | 1,181,806 $\div$ 27. | (40.) | 876,097,241 $\div$ 144. |

Also work the above exercises by Long Division.

3°. When the divisor exceeds 12, the operation is termed *Long Division*.

Example

$$\begin{array}{r}
 2,546 \quad \textit{Quotient.} \\
 93 \overline{) 236,827 \div 93} \\
 186 \quad \textit{+++} \\
 \hline
 508 \\
 465 \\
 \hline
 432 \\
 372 \\
 \hline
 607 \\
 558 \\
 \hline
 49 \quad \textit{Remainder.}
 \end{array}$$

In this case the quotient is placed above the dividend, the

first figure of the quotient standing exactly above the right-hand figure of the first partial dividend.

Care must be taken to put a 0 in the quotient, when the divisor is not contained in a partial dividend.

### Exercise 20.

|       |               |       |                 |
|-------|---------------|-------|-----------------|
| (1.)  | 51,127 ÷ 41.  | (33.) | 100,096 ÷ 46.   |
| (2.)  | 356,362 ÷ 61. | (39.) | 101,116 ÷ 68.   |
| (3.)  | 265,194 ÷ 81. | (40.) | 104,351 ÷ 23.   |
| (4.)  | 213,843 ÷ 51. | (41.) | 82,029 ÷ 37.    |
| (5.)  | 27,888 ÷ 21.  | (42.) | 71,967 ÷ 23.    |
| (6.)  | 650,559 ÷ 91. | (43.) | 179,619 ÷ 48.   |
| (7.)  | 581,742 ÷ 81. | (44.) | 271,879 ÷ 37.   |
| (8.)  | 49,376 ÷ 32.  | (45.) | 208,768 ÷ 56.   |
| (9.)  | 123,448 ÷ 52. | (46.) | 118,398 ÷ 27.   |
| (10.) | 178,200 ÷ 72. | (47.) | 158,158 ÷ 43.   |
| (11.) | 568,836 ÷ 92. | (48.) | 167,805 ÷ 45.   |
| (12.) | 233,856 ÷ 72. | (49.) | 176,062 ÷ 47.   |
| (13.) | 841,064 ÷ 92. | (50.) | 315,328 ÷ 64.   |
| (14.) | 64,134 ÷ 42.  | (51.) | 245,447 ÷ 93.   |
| (15.) | 109,280 ÷ 32. | (52.) | 315,672 ÷ 84.   |
| (16.) | 111,540 ÷ 52. | (53.) | 332,658 ÷ 67.   |
| (17.) | 197,408 ÷ 62. | (54.) | 88,536 ÷ 62.    |
| (18.) | 421,972 ÷ 82. | (55.) | 87,098 ÷ 57.    |
| (19.) | 565,936 ÷ 62. | (56.) | 62,256 ÷ 36.    |
| (20.) | 359,324 ÷ 82. | (57.) | 46,926 ÷ 27.    |
| (21.) | 75,504 ÷ 24.  | (58.) | 121,638 ÷ 57.   |
| (22.) | 88,425 ÷ 27.  | (59.) | 101,880 ÷ 45.   |
| (23.) | 292,147 ÷ 45. | (60.) | 108,916 ÷ 73.   |
| (24.) | 285,211 ÷ 63. | (61.) | 261,696 ÷ 64.   |
| (25.) | 226,969 ÷ 49. | (62.) | 470,990 ÷ 84.   |
| (26.) | 223,839 ÷ 57. | (63.) | 344,865 ÷ 49.   |
| (27.) | 176,285 ÷ 38. | (64.) | 540,698 ÷ 67.   |
| (28.) | 82,516 ÷ 28.  | (65.) | 381,250 ÷ 54.   |
| (29.) | 259,514 ÷ 56. | (66.) | 365,760 ÷ 72.   |
| (30.) | 282,437 ÷ 53. | (67.) | 340,337 ÷ 48.   |
| (31.) | 460,579 ÷ 87. | (68.) | 3,121,950 ÷ 65. |
| (32.) | 348,231 ÷ 76. | (69.) | 1,583,678 ÷ 39. |
| (33.) | 205,348 ÷ 69. | (70.) | 2,886,176 ÷ 94. |
| (34.) | 59,438 ÷ 43.  | (71.) | 224,548 ÷ 73.   |
| (35.) | 54,356 ÷ 37.  | (72.) | 481,527 ÷ 65.   |
| (36.) | 80,808 ÷ 42.  | (73.) | 197,849 ÷ 39.   |
| (37.) | 82,108 ÷ 37.  | (74.) | 353,827 ÷ 58.   |

|        |                        |            |                                    |
|--------|------------------------|------------|------------------------------------|
| (75.)  | $151,356 \div 37.$     | (83.)      | $60,979,590 \div 86.$              |
| (76.)  | $284,580 \div 93.$     | (84.)      | $14,834,496 \div 48.$              |
| (77.)  | $230,269 \div 75.$     | (85.)      | $23,753,867 \div 39.$              |
| (78.)  | $2,001,240 \div 54.$   | (86.)      | $37,950,720 \div 48.$              |
| (79.)  | $1,421,588 \div 46.$   | (87.)      | $21,885,199 \div 56.$              |
| (80.)  | $1,818,561 \div 87.$   | (88.)      | $49,307,876 \div 83.$              |
| (81.)  | $73,841,086 \div 84.$  | (89.)      | $36,899,389 \div 79.$              |
| (82.)  | $39,590,658 \div 65.$  | (90.)      | $32,960,248 \div 65.$              |
|        |                        | (91- 94.)  | $680,409,378 \div 13, 14, 15, 16.$ |
|        |                        | (95- 98.)  | $960,739,482 \div 99, 89, 79, 69.$ |
|        |                        | (99-102.)  | $856,493,785 \div 98, 88, 78, 68.$ |
|        |                        | (103-106.) | $680,409,378 \div 17, 18, 19, 20.$ |
|        |                        | (107-110.) | $660,408,736 \div 13, 14, 15, 16.$ |
|        |                        | (111-114.) | $920,738,549 \div 99, 89, 79, 69.$ |
|        |                        | (115-118.) | $836,943,587 \div 98, 88, 78, 68.$ |
|        |                        | (119-122.) | $660,408,736 \div 17, 18, 19, 20.$ |
|        |                        | (123-126.) | $690,342,707 \div 13, 14, 15, 16.$ |
|        |                        | (127-130.) | $690,342,707 \div 17, 18, 19, 20.$ |
| (131.) | $53,871,740 \div 708.$ | (146.)     | $36,727,854 \div 518.$             |
| (132.) | $57,015,386 \div 904.$ | (147.)     | $47,892,768 \div 528.$             |
| (133.) | $27,252,587 \div 306.$ | (148.)     | $21,883,212 \div 437.$             |
| (134.) | $41,082,095 \div 520.$ | (149.)     | $25,352,733 \div 419.$             |
| (135.) | $15,912,596 \div 430.$ | (150.)     | $19,431,048 \div 637.$             |
| (136.) | $38,094,720 \div 480.$ | (151.)     | $5,005,001 \div 9,009.$            |
| (137.) | $32,808,594 \div 546.$ | (152.)     | $43,210,040 \div 1,236.$           |
| (138.) | $58,771,388 \div 734.$ | (153.)     | $34,024,375 \div 4,375.$           |
| (139.) | $18,537,797 \div 394.$ | (154.)     | $109,426,051 \div 7,315.$          |
| (140.) | $40,860,337 \div 537.$ | (155.)     | $61,700,504 \div 3,042.$           |
| (141.) | $49,588,764 \div 786.$ | (156.)     | $56,030,169 \div 2,044.$           |
| (142.) | $46,875,154 \div 483.$ | (157.)     | $86,093 \div 9,876.$               |
| (143.) | $31,961,044 \div 456.$ | (158.)     | $1,736,009 \div 4,761.$            |
| (144.) | $16,125,462 \div 318.$ | (159.)     | $4,070,391 \div 71,068.$           |
| (145.) | $15,791,664 \div 516.$ | (160.)     | $302,129,168 \div 6,704.$          |

## Exercise 21.

- (1.) Divide nine thousand seven hundred and sixty-seven by twenty-two.
- (2.) How many times will thirty-one divide into one thousand six hundred and seventy-four?
- (3.) Divide three thousand and nine by thirty-two.
- (4.) Divide nineteen thousand and thirty-two by sixty-one.
- (5.) Divide forty thousand two hundred and seventy-eight by seventy-five.

EXAMINATION EXERCISES FOR THIRD CLASS.  
SET I.

| A. | (1.)                     | B. | (1.)                    | C. | (1.)                                      |
|----|--------------------------|----|-------------------------|----|---|
|    | From 987,654             |    | From 906,009            |    | From 390,676                              |
|    | Take <u>876</u>          |    | Take <u>79,998</u>      |    | Take <u>9,599</u>                         |
|    | (2.)                     |    | (2.)                    |    | (2.)                                      |
|    | 978,637 $\times$ 89.     |    | 62,408 $\times$ 97.     |    | 48,798 $\times$ 82.                       |
|    | (3.)                     |    | (3.)                    |    | (3.)                                      |
|    | <u>7) 978,765</u>        |    | <u>11) 463,090</u>      |    | <u>327,487 <math>\div</math> 8.</u>       |
|    | (4.)                     |    | (4.)                    |    | (4.)                                      |
|    | <u>£ s. d.</u>           |    | <u>£ s. d.</u>          |    | <u>£ s. d.</u>                            |
|    | 86 17 11 $\frac{1}{2}$   |    | 3907 17 8 $\frac{1}{2}$ |    | 5909 19 9 $\frac{1}{2}$                   |
|    | 146 13 10 $\frac{1}{2}$  |    | 423 14 11 $\frac{1}{4}$ |    | 90 8 11 $\frac{3}{4}$                     |
|    | 56 12 9 $\frac{3}{4}$    |    | 39 19 9                 |    | 9 17 5                                    |
|    | 8 16 4 $\frac{1}{2}$     |    | 6275 15 8 $\frac{1}{4}$ |    | 98 14 6 $\frac{1}{2}$                     |
|    | 36 9 5 $\frac{1}{2}$     |    | 390 0 8                 |    | <u>3547 16 10<math>\frac{1}{4}</math></u> |
|    | (5.)                     |    | (5.)                    |    | (5.)                                      |
|    | 798,625 $\div$ 19.       |    | 900,009 $\div$ 18.      |    | 400,306 $\div$ 69.                        |
| D. | (1.)                     | E. | (1.)                    | F. | (1.)                                      |
|    | From 507,007             |    | From 90,609             |    | From 100,001                              |
|    | Take <u>98,980</u>       |    | Take <u>9,090</u>       |    | Take <u>79,099</u>                        |
|    | (2.)                     |    | (2.)                    |    | (2.)                                      |
|    | 536,907 $\times$ 69.     |    | 78,098 $\times$ 49.     |    | $\times$ 83.                              |
|    | (3.)                     |    | (3.)                    |    |   |
|    | 326,608 $\div$ 12.       |    | 326,865 $\div$ 10.      |    |   |
|    | (4.)                     |    | (4.)                    |    |   |
|    | <u>£ s. d.</u>           |    | <u>£ s. d.</u>          |    |   |
|    | 8764 14 10 $\frac{1}{2}$ |    | 997 17 11 $\frac{1}{4}$ |    |   |
|    | 329 19 9 $\frac{3}{4}$   |    | 33 10 10 $\frac{1}{2}$  |    |   |
|    | 725 15 11                |    | 19 9                    |    |   |
|    | 49 18 9 $\frac{1}{2}$    |    | 0 4 $\frac{1}{2}$       |    |   |
|    | 368 0 6                  |    | 0 0 $\frac{1}{2}$       |    |   |
|    | (5.)                     |    |                         |    |   |

| (5.)      | (6.)       | (7.)       | (8.)      |
|-----------|------------|------------|-----------|
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 21 3 4    | 90 7 6     | 18 5 3     | 17 1 5    |
| 206 10 3  | 7 2 1      | 407 10 6   | 408 7 10  |
| 18 5 2    | 405 4 3    | 39 0 8     | 651 2 8   |
| 4 1 2     | 18 5 0     | 723 2 7    | 17 7 11   |
|           |            |            | 4 0 5     |
| (9.)      | (10.)      | (11.)      | (12.)     |
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 78 2 7    | 307 6 11   | 370 2 9    | 40 1 10   |
| 3 10 9    | 21 2 8     | 83 5 6     | 8 3 8     |
| 16 4 6    | 5 9        | 409 1 11   | 7 6       |
| 408 0 11  | 728 0 7    | 34 4 4     | 293 0 9   |
| 671 0 10  | 13 1 5     | 860 3 7    | 17 2 2    |
| (13.)     | (14.)      | (15.)      | (16.)     |
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 493 7 7   | 605 19 7½  | 9061 8 10  | 48 7 7½   |
| 678 2 8   | 386 10 10½ | 79 4 9½    | 65 9 4½   |
| 11 0 11   | 76 9 8     | 438 12 8½  | 84 2 10½  |
| 2 4 5     | 407 14 6½  | 765 9 9½   | 76 3 8½   |
| 18 0 9    | 95 12 4½   | 47 13 5½   | 45 4 6½   |
| (17.)     | (18.)      | (19.)      | (20.)     |
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 702 18 9  | 671 19 5½  | 706 14 8½  | 76 9 4½   |
| 67 3 8½   | 48 12 11   | 72 9 9½    | 85 7 10½  |
| 456 0 9½  | 765 9 7½   | 385 12 6   | 372 8 6½  |
| 72 14 3½  | 37 18 4½   | 47 5 8½    | 94 5 9½   |
| 684 12 7½ | 9384 6 5½  | 40 6 0½    | 76 2 11   |
| (21.)     | (22.)      | (23.)      | (24.)     |
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 76 11 0½  | 70 19 4½   | 119 14 7½  | 79 12 8½  |
| 807 9 9½  | 6 4 8½     | 68 12 10½  | 65 14 9½  |
| 53 17 11½ | 929 18 7½  | 725 14 8   | 872 8 6½  |
| 65 4 4    | 67 14 11½  | 67 8 9½    | 45 9 9½   |
| 281 18 6½ | 37 10 0½   | 436 3 3½   | 165 0 6   |
| (25.)     | (26.)      | (27.)      | (28.)     |
| £ s. d.   | £ s. d.    | £ s. d.    | £ s. d.   |
| 7 10 6½   | 78 12 9½   | 670 14 2½  | 708 12 9½ |
| 384 12 2  | 605 19 7½  | 58 12 9½   | 67 9 5½   |
| 95 4 8½   | 26 18 0    | 672 11 11½ | 45 16 7½  |
| 47 16 4   | 729 3 7½   | 84 9 8½    | 729 3 8½  |
| 738 8 2½  | 45 4 4½    | 936 14 7½  | 46 18 8½  |

EXAMINATION EXERCISES FOR THIRD CLASS.  
SET I.

| A.   | B.   | C.   |
|--|--|--|
| (1.)<br>From 987,654<br>Take <u>876</u>  | (1.)<br>From 906,009<br>Take <u>79,998</u>   | (1.)<br>From 390,676<br>Take <u>9,599</u>  |
| (2.)<br>$978,637 \times 89.$   | (2.)<br>$62,408 \times 97.$  | (2.)<br>$48,798 \times 82.$  |
| (3.)<br><u>7) 978,765</u>  | (3.)<br><u>11) 463,090</u>   | (3.)<br>$327,487 \div 8.$  |
| (4.)<br><u>£ s. d.</u><br>86 17 11 $\frac{1}{2}$<br>146 13 10 $\frac{1}{2}$<br>56 12 9 $\frac{3}{4}$<br>8 16 4 $\frac{1}{2}$<br>36 9 5 $\frac{1}{2}$ | (4.)<br><u>£ s. d.</u><br>3907 17 8 $\frac{1}{2}$<br>423 14 11 $\frac{1}{2}$<br>39 19 9<br>6275 15 8 $\frac{1}{2}$<br>390 0 8            | (4.)<br><u>£ s. d.</u><br>5909 19 9 $\frac{1}{2}$<br>90 8 11 $\frac{3}{4}$<br>9 17 5<br>98 14 6 $\frac{1}{2}$<br>3547 16 10 $\frac{1}{2}$  |
| (5.)<br>$798,625 \div 19.$   | (5.)<br>$900,009 \div 18.$   | (5.)<br>$400,306 \div 69.$   |
| D.   | E.   | F.   |
| (1.)<br>From 507,007<br>Take <u>98,980</u>   | (1.)<br>From 90,609<br>Take <u>9,090</u>   | (1.)<br>From 100,001<br>Take <u>79,099</u>   |
| (2.)<br>$536,907 \times 69.$   | (2.)<br>$78,098 \times 49.$  | (2.)<br>$90,697 \times 83.$  |
| (3.)<br>$326,608 \div 12.$   | (3.)<br>$326,865 \div 10.$   | (3.)<br><u>12) 487,908</u>   |
| (4.)<br><u>£ s. d.</u><br>8764 14 10 $\frac{1}{2}$<br>329 19 9 $\frac{3}{4}$<br>725 15 11<br>49 18 9 $\frac{1}{2}$<br>368 0 6                        | (4.)<br><u>£ s. d.</u><br>997 17 11 $\frac{1}{2}$<br>38 16 10 $\frac{1}{2}$<br>869 19 9<br>47 0 4 $\frac{1}{2}$<br>389 0 8 $\frac{3}{4}$ | (4.)<br><u>£ s. d.</u><br>8647 17 10 $\frac{1}{2}$<br>92 10 0 $\frac{1}{4}$<br>9 15 8<br>986 19 11 $\frac{1}{2}$<br>4803 5 6 $\frac{1}{4}$ |
| (5.)<br>$06,328 \div 58.$  | (5.)<br>$190,609 \div 18.$   |  |

|       | (6.)       | (7.)       | (8.)      |
|-------|------------|------------|-----------|
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 3 4   | 90 7 6     | 18 5 3     | 408 7 10  |
| 0 3   | 7 2 1      | 407 10 6   | 651 2 8   |
| 5 2   | 405 4 3    | 39 0 8     | 17 7 11   |
| 1 2   | 18 5 0     | 723 2 7    | 4 0 5     |
|       | <hr/>      | <hr/>      | <hr/>     |
|       | (10.)      | (11.)      | (12.)     |
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 2 7   | 307 6 11   | 370 2 9    | 40 1 10   |
| 0 9   | 21 2 8     | 83 5 6     | 8 3 8     |
| 4 6   | 5 9        | 409 1 11   | 7 6       |
| 0 11  | 728 0 7    | 34 4 4     | 293 0 9   |
| 0 10  | 13 1 5     | 860 3 7    | 17 2 2    |
|       | <hr/>      | <hr/>      | <hr/>     |
|       | (14.)      | (15.)      | (16.)     |
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 7 7   | 605 19 7½  | 9061 8 10  | 48 7 7½   |
| 2 8   | 386 10 10½ | 79 4 9½    | 65 9 4½   |
| 0 11  | 76 9 8     | 438 12 8½  | 84 2 10½  |
| 4 5   | 407 14 6½  | 765 9 9½   | 76 3 8½   |
| 0 9   | 95 12 4½   | 47 13 5½   | 45 4 6½   |
|       | <hr/>      | <hr/>      | <hr/>     |
|       | (18.)      | (19.)      | (20.)     |
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 8 9   | 671 19 5½  | 706 14 8½  | 76 9 4½   |
| 3 8½  | 48 12 11   | 72 9 9½    | 85 7 10½  |
| 0 9½  | 765 9 7½   | 385 12 6   | 372 8 6½  |
| 4 3½  | 37 18 4½   | 47 5 8½    | 94 5 9½   |
| 2 7½  | 9384 6 5½  | 40 6 0½    | 76 2 11   |
|       | <hr/>      | <hr/>      | <hr/>     |
|       | (22.)      | (23.)      | (24.)     |
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 1 0½  | 70 19 4½   | 119 14 7½  | 79 12 8½  |
| 9 9½  | 6 4 8½     | 68 12 10½  | 65 14 9½  |
| 7 11½ | 929 18 7½  | 725 14 8   | 872 8 6½  |
| 4 4   | 67 14 11½  | 67 8 9½    | 45 9 9½   |
| 8 6½  | 37 10 0½   | 436 3 3½   | 165 0 6   |
|       | <hr/>      | <hr/>      | <hr/>     |
|       | (26.)      | (27.)      | (28.)     |
| d.    | £ s. d.    | £ s. d.    | £ s. d.   |
| 0 6½  | 78 12 9½   | 670 14 2½  | 708 12 9½ |
| 2 2   | 605 19 7½  | 58 12 9½   | 67 9 5½   |
| 4 8½  | 26 18 0    | 672 11 11½ | 45 16 7½  |
| 6 4   | 729 3 7½   | 84 9 8½    | 729 3 8½  |
| 8 2½  | 45 4 4½    | 936 14 7½  | 48 18 8½  |

EXAMINATION EXERCISES FOR THIRD CLASS.  
SET I.

|  |   |  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
|--|---|--|----|------|----|------------------|-----|------------------|-----------------|-----|------------------|----|----|-----------------|-----------------|-----|-----------------|----|--|-----------------|----|----|-----|----|------------------|----|----|------------------|-----|----|---|----|---|-----------------|-----|---|-----------------|--|---|----|----|------|----|------------------|----|----|-----------------|-----|----|------------------|------|---|-----------------|
| <b>A.</b><br>(1.)<br>From 987,654<br>Take <u>876</u><br><br>(2.)<br>$978,637 \times 89.$<br><br>(3.)<br><u>7 ) 978,765</u>   | <b>B.</b><br>(1.)<br>From 906,009<br>Take <u>79,998</u><br><br>(2.)<br>$62,408 \times 97.$<br><br>(3.)<br><u>11 ) 463,090</u> | <b>C.</b><br>(1.)<br>From 390,676<br>Take <u>9,599</u><br><br>(2.)<br>$48,798 \times 82.$<br><br>(3.)<br>$327,487 \div 8.$<br><br>(4.)<br><table style="margin-left: auto; margin-right: auto;"> <tr><td>£</td><td>s.</td><td>d.</td></tr> <tr><td>86</td><td>17</td><td>11<math>\frac{1}{2}</math></td></tr> <tr><td>146</td><td>13</td><td>10<math>\frac{1}{4}</math></td></tr> <tr><td>56</td><td>12</td><td>9<math>\frac{1}{4}</math></td></tr> <tr><td>8</td><td>16</td><td>4<math>\frac{1}{2}</math></td></tr> <tr><td>36</td><td>9</td><td>5<math>\frac{1}{4}</math></td></tr> </table> | £  | s.   | d. | 86               | 17  | 11 $\frac{1}{2}$ | 146             | 13  | 10 $\frac{1}{4}$ | 56 | 12 | 9 $\frac{1}{4}$ | 8               | 16  | 4 $\frac{1}{2}$ | 36 | 9  | 5 $\frac{1}{4}$ |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| £  | s.  | d.   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 86   | 17  | 11 $\frac{1}{2}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 146  | 13  | 10 $\frac{1}{4}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 56   | 12  | 9 $\frac{1}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 8  | 16  | 4 $\frac{1}{2}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 36   | 9   | 5 $\frac{1}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| (5.)<br>$798,625 \div 19.$   | (5.)<br>$900,009 \div 18.$  | (5.)<br>$400,306 \div 69.$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| <b>D.</b><br>(1.)<br>From 507,007<br>Take <u>98,980</u><br><br>(2.)<br>$536,907 \times 69.$<br><br>(3.)<br>$326,608 \div 12.$<br><br>(4.)<br><table style="margin-left: auto; margin-right: auto;"> <tr><td>£</td><td>s.</td><td>d.</td></tr> <tr><td>8764</td><td>14</td><td>10<math>\frac{1}{2}</math></td></tr> <tr><td>329</td><td>19</td><td>9<math>\frac{1}{4}</math></td></tr> <tr><td>725</td><td>15</td><td>11</td></tr> <tr><td>49</td><td>18</td><td>9<math>\frac{1}{2}</math></td></tr> <tr><td>368</td><td>0</td><td>6</td></tr> </table> | £   | s.   | d. | 8764 | 14 | 10 $\frac{1}{2}$ | 329 | 19               | 9 $\frac{1}{4}$ | 725 | 15               | 11 | 49 | 18              | 9 $\frac{1}{2}$ | 368 | 0               | 6  | <b>E.</b><br>(1.)<br>From 90,609<br>Take <u>9,090</u><br><br>(2.)<br>$78,098 \times 49.$<br><br>(3.)<br>$326,865 \div 10.$<br><br>(4.)<br><table style="margin-left: auto; margin-right: auto;"> <tr><td>£</td><td>s.</td><td>d.</td></tr> <tr><td>997</td><td>17</td><td>11<math>\frac{1}{2}</math></td></tr> <tr><td>38</td><td>16</td><td>10<math>\frac{1}{4}</math></td></tr> <tr><td>869</td><td>19</td><td>9</td></tr> <tr><td>47</td><td>0</td><td>4<math>\frac{1}{2}</math></td></tr> <tr><td>389</td><td>0</td><td>8<math>\frac{3}{4}</math></td></tr> </table> | £               | s. | d. | 997 | 17 | 11 $\frac{1}{2}$ | 38 | 16 | 10 $\frac{1}{4}$ | 869 | 19 | 9 | 47 | 0 | 4 $\frac{1}{2}$ | 389 | 0 | 8 $\frac{3}{4}$ | <b>F.</b><br>(1.)<br>From 100,001<br>Take <u>79,099</u><br><br>(2.)<br>$90,697 \times 83.$<br><br>(3.)<br><u>12 ) 487,908</u><br><br>(4.)<br><table style="margin-left: auto; margin-right: auto;"> <tr><td>£</td><td>s.</td><td>d.</td></tr> <tr><td>8647</td><td>17</td><td>10<math>\frac{1}{2}</math></td></tr> <tr><td>92</td><td>10</td><td>0<math>\frac{1}{4}</math></td></tr> <tr><td>986</td><td>19</td><td>11<math>\frac{1}{2}</math></td></tr> <tr><td>4803</td><td>5</td><td>6<math>\frac{3}{4}</math></td></tr> </table> | £ | s. | d. | 8647 | 17 | 10 $\frac{1}{2}$ | 92 | 10 | 0 $\frac{1}{4}$ | 986 | 19 | 11 $\frac{1}{2}$ | 4803 | 5 | 6 $\frac{3}{4}$ |
| £  | s.  | d.   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 8764   | 14  | 10 $\frac{1}{2}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 329  | 19  | 9 $\frac{1}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 725  | 15  | 11   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 49   | 18  | 9 $\frac{1}{2}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 368  | 0   | 6  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| £  | s.  | d.   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 997  | 17  | 11 $\frac{1}{2}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 38   | 16  | 10 $\frac{1}{4}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 869  | 19  | 9  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 47   | 0   | 4 $\frac{1}{2}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 389  | 0   | 8 $\frac{3}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| £  | s.  | d.   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 8647   | 17  | 10 $\frac{1}{2}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 92   | 10  | 0 $\frac{1}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 986  | 19  | 11 $\frac{1}{2}$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| 4803   | 5   | 6 $\frac{3}{4}$  |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |
| (5.)<br>$432,068 \div 19.$   | (5.)<br>$606,328 \div 58.$  | (5.)<br>$190,609 \div 18.$   |    |      |    |                  |     |                  |                 |     |                  |    |    |                 |                 |     |                 |    |  |                 |    |    |     |    |                  |    |    |                  |     |    |   |    |   |                 |     |   |                 |  |   |    |    |      |    |                  |    |    |                 |     |    |                  |      |   |                 |

U. (1.)  
From 100,720  
Take 6,009

(2.)  
 $96,058 \times 75.$

(3.)  
 $690,538 \div 7.$

(4.)  

|      |    |                  |
|------|----|------------------|
| £    | s. | d.               |
| 9065 | 14 | 10 $\frac{1}{2}$ |
| 732  | 18 | 4                |
| 64   | 19 | 11 $\frac{1}{2}$ |
| 2468 | 0  | 0                |
| 762  | 15 | 9 $\frac{1}{2}$  |

(5.)  
 $590,742 \div 68.$

V. (1.)  
From 109,709  
Take 294

(2.)  
 $50,586 \times 87.$

(3.)  
 $724,506 \div 12.$

(4.)  

|      |    |                  |
|------|----|------------------|
| £    | s. | d.               |
| 9909 | 14 | 11               |
| 801  | 16 | 10 $\frac{1}{4}$ |
| 80   | 17 | 4                |
| 293  | 12 | 7 $\frac{1}{2}$  |
| 9    | 2  | 9 $\frac{1}{2}$  |

(5.)  
 $90,608 \div 68.$

W. (1.)  
From 1,000,000  
Take 29,009

(2.)  
 $907,909 \times 94.$

(3.)  
 $100,906 \div 7.$

(4.)  

|      |    |                  |
|------|----|------------------|
| £    | s. | d.               |
| 7406 | 19 | 9 $\frac{3}{4}$  |
| 268  | 16 | 8 $\frac{1}{4}$  |
| 47   | 15 | 11 $\frac{1}{2}$ |
| 3628 | 16 | 10 $\frac{1}{4}$ |
| 300  | 13 | 0                |

(5.)  
 $746,327 \div 89.$

X. (1.)  
From 90,764  
Take 9,007

(2.)  
 $69,508 \times 78.$

(3.)  
 $506,308 \div 9.$

(4.)  

|      |    |                 |
|------|----|-----------------|
| £    | s. | d.              |
| 8766 | 16 | 6 $\frac{1}{2}$ |
| 4327 | 17 | 11              |
| 288  | 18 | 9 $\frac{1}{2}$ |
| 8966 | 16 | 6               |
| 28   | 0  | 0 $\frac{1}{2}$ |

(5.)  
 $100,009 \div 95.$

Y. (1.)  
From 900,607  
Take 20,101

(2.)  
 $760,439 \times 68.$

(3.)  
 $307,090 \div 12.$

(4.)  

|      |    |                  |
|------|----|------------------|
| £    | s. | d.               |
| 1009 | 19 | 9 $\frac{1}{2}$  |
| 653  | 17 | 11 $\frac{1}{4}$ |
| 22   | 0  | 0                |
| 483  | 18 | 10 $\frac{3}{4}$ |
| 68   | 16 | 6 $\frac{1}{2}$  |

(5.)  
 $265,408 \div 19.$

Z. (1.)  
From 100,770  
Take 9,009

(2.)  
 $56,708 \times 98$

(3.)  
 $406,532 \div 7$

(4.)  

|      |    |                  |
|------|----|------------------|
| £    | s. | d.               |
| 7007 | 17 | 10 $\frac{1}{2}$ |
| 468  | 18 | 11 $\frac{1}{2}$ |
| 77   | 10 | 0                |
| 6366 | 18 | 0 $\frac{1}{4}$  |
| 208  | 0  | 8                |

(5.)  
 $648,008 \div 18$

## SET II.

## A2.

- (1.) Write, in figures, five hundred and two thousand and ninety.
- (2.) Take 70,516 from 2,005,238.
- (3.) Multiply 39,672 by 382.
- (4.) Divide 7,968,234 by 54 (using factors).
- (5.) Divide 67 into 392,674.
- (6.) Add £7. 9s. 6*½*d., £87. 13s. 9*½*d., £706. 11s. 8*½*d., £428. 16s. 10*½*d., and £19. 5s. 8d.

## B2.

- (1.) Write in words : 704,009
- (2.) From 202,011 take 29,069.
- (3.) Multiply 796,827 by 79.
- (4.) Divide 396,729 by 56 (using factors).
- (5.) Divide 936,279 by 58.
- (6.) Find the sum of 3s. 9*½*d., 17s. 8*½*d., 6s. 10*½*d., 7*½*d., and 9s. 6d.

## C2.

- (1.) Add together 4,869, 52,738, 49, 67,082, 86,327, and 91.
- (2.) Take 66,000 from 70,101.
- (3.) Multiply 893,624 by 750.
- (4.) Divide 936,274 by 84 (using factors).
- (5.) Divide 368 into 927,348.
- (6.) Add £76. 8s. 4*½*d.; £59. 0s. 8*½*d., 17s. 6*½*d., £370. 18s. 7*½*d., £59. 16s. 8*½*d.

## D2.

- (1.) Write in words : 350,020.
- (2.) Find the difference between 70,407 and 698.
- (3.)  $89607 \times 8070$ .
- (4.) Divide 9,329,684 by 108 (using factors).
- (5.) Divide 839,672 by 807.
- (6.) Add £19. 19s. 9*½*d., £37. 15s. 8*½*d., £19. 8s. 7*½*d., 18s. 9d., £870. 19s. 8*½*d.

## E2.

- (1.) Take one thousand four hundred and nine from seventy thousand and four.
- (2.) Find the product of 39,562 and 583.

- (a.) Divide 976,823 by 99 (using factors).
- (4.)  $3,920,763 \div 879$ .
- (5.)  $89,723 \times 590$ .
- (6.) Add £39. 13s.  $7\frac{1}{2}d$ ., £58. 17s.  $6\frac{3}{4}d$ ., £25. 9s. 6d., 19s.  $11\frac{1}{2}d$ , £8070. 19s. 8d.

## F2.

- (1.) Write in figures, six hundred thousand and two.
- (2.) The minuend is 980,762 and the subtrahend is 999, find the remainder.
- (3.) Multiply 83,962 by 839.
- (4.) Divide 832,967 by 42 (using factors).
- (5.) Divide 83,296 by 186.
- (6.) Add £39. 8s. 9d., £82. 19s.  $9\frac{3}{4}d$ ., 19s.  $8\frac{1}{2}d$ ., £576. 13s.  $8\frac{1}{4}d$ ., £25. 11s.  $11\frac{1}{2}d$ .

## G2.

- (1.) Subtract 7680 from 201,023.
- (2.) Write in words : 30,010.
- (3.) Multiply 89,672 by 6802.
- (4.)  $9,273,864 \div 63$  (using factors).
- (5.) Divide 896,237 by 896.
- (6.) Add £839. 13s.  $7\frac{1}{2}d$ ., £29. 17s.  $8\frac{1}{2}d$ ., £396. 13s.  $8\frac{1}{2}d$ ., £372. 13s. 5d., £296. 12s.  $11\frac{3}{4}d$ .

## H2.

- (1.) Write in words, 100,101.
- (2.) Take 90,909 from 1,010,101.
- (3.)  $6829 \times 7809$ .
- (4.) Divide 3,962,734 by 110 (using factors).
- (5.) Divide 839,627 by 827.
- (6.) Add £39. 19s. 8d., £3276. 8s. 9d., 19s.  $8\frac{1}{2}d$ ., £932. 13s.  $7\frac{3}{4}d$ ., £82. 19s.  $6\frac{1}{2}d$ .

## I2.

- (1.) Add 98,273, 682, 93,738, 29, 683, and 92,738
- (2.) From 2,839,067 take 980,796.
- (3.) What is the product of 8396 and 792.
- (4.)  $9,372,983 \div 72$  (using factors).
- (5.) 19 is the divisor and 639,274 is the dividend, find the quotient.
- (6.) Add 2s.  $9\frac{1}{2}d$ ., 17s.  $6\frac{3}{4}d$ ., £3827. 13s.  $8\frac{1}{4}d$ ., 15s.  $4\frac{1}{2}d$ , £3708. 13s. 8d.

## K2.

- (1.) Write in words, 500,000.
- (2.) From 9,101,001 take 80,909.
- (3.) Multiply 39,682 by 870.
- (4.) Divide 8,392,879 by 77 (using factors).
- (5.) Divide 829,607 by 865.
- (6.) Add £8. 13s. 7½d., £397. 13s. 8½d., £96. 13s. 8½d., £72. 19s. 8½d., £83,967. 13s. 7½d.

## Exercise 23.

| (1.)    |    |     | (2.)    |    |     | (3.)    |    |     |
|---------|----|-----|---------|----|-----|---------|----|-----|
| £       | s. | d.  | £       | s. | d.  | £       | s. | d.  |
| 62      | 18 | 7½  | 942     | 17 | 10½ | 842     | 16 | 11½ |
| 400     | 5  | 11½ | 17      | 18 | 6½  | 8345    | 2  | 6½  |
| 2460    | 0  | 10  | 2704    | 3  | 8   | 1009    | 17 | 8   |
| 17      | 9  | 8½  | 2       | 12 | 8½  | 342     | 16 | 5½  |
| 2468    | 19 | 2½  | 7263    | 5  | 9   | 17      | 0  | 11½ |
| 17      | 11 | 4   | 14      | 15 | 6½  | 6270    | 18 | 6½  |
| (4.)    |    |     | (5.)    |    |     | (6.)    |    |     |
| £       | s. | d.  | £       | s. | d.  | £       | s. | d.  |
| 908     | 17 | 6   | 7329    | 4  | 8½  | 328,046 | 10 | 4   |
| 17      | 9  | 10½ | 940     | 17 | 2½  | 296,307 | 17 | 1½  |
| 3456    | 12 | 1½  | 18      | 2  | 10  | 900,740 | 3  | 10½ |
| 12      | 4  | 4   | 7211    | 10 | 9½  | 209,604 | 18 | 2½  |
| 421     | 5  | 2½  | 478     | 16 | 8½  | 76,421  | 17 | 6½  |
| 19      | 2  | 6½  | 9320    | 19 | 0½  | 48,908  | 14 | 10½ |
| (7.)    |    |     | (8.)    |    |     | (9.)    |    |     |
| £       | s. | d.  | £       | s. | d.  | £       | s. | d.  |
| 191,708 | 16 | 1½  | 706,314 | 2  | 6½  | 87,612  | 19 | 0½  |
| 184,320 | 12 | 10  | 542,790 | 16 | 1½  | 64,017  | 18 | 6½  |
| 470,806 | 14 | 1½  | 93,014  | 2  | 8   | 17,408  | 16 | 1½  |
| 107,920 | 7  | 11  | 49,650  | 14 | 2½  | 8,909   | 18 | 7   |
| 49,017  | 18 | 2½  | 420,942 | 2  | 0½  | 117,049 | 16 | 8   |
| 17,462  | 19 | 2½  | 308,206 | 0  | 8   | 109,850 | 14 | 2½  |
| (10.)   |    |     | (11.)   |    |     | (12.)   |    |     |
| £       | s. | d.  | £       | s. | d.  | £       | s. | d.  |
| 763,209 | 3  | 6   | 617,420 | 17 | 8½  | 315,017 | 19 | 6½  |
| 317,608 | 4  | 9½  | 89,293  | 18 | 1½  | 8,235   | 16 | 9   |
| 240,901 | 2  | 8   | 118,042 | 16 | 0½  | 79      | 8  | 11½ |
| 146,018 | 9  | 10½ | 79,450  | 2  | 8½  | 639,372 | 17 | 6½  |
| 340,821 | 5  | 1   | 218,276 | 18 | 6½  | 35,079  | 8  | 4   |
| 207,048 | 9  | 6½  | 109,362 | 12 | 10½ | 6,249   | 8  | 7½  |

Add together :—

- (13.) £62. 18s.  $7\frac{1}{2}$ d., £5871. 17s. 9d., £25. 17s.  $4\frac{1}{2}$ d., £1000. 15s. 9d., £52,687. 13s.  $9\frac{3}{4}$ d., £58. 0s.  $11\frac{1}{2}$ d., £3695. 17s.  $9\frac{3}{4}$ d.
- (14.) £575. 13s.  $8\frac{1}{2}$ d., £5307. 13s.  $6\frac{3}{4}$ d., £257. 19s.  $8\frac{3}{4}$ d., £50. £73,862. 19s.  $11\frac{3}{4}$ d., £396. 12s. 6d., £52. 18s.  $7\frac{1}{2}$ d.
- (15.) £397. 18s. 6d., £3268. 13s.  $7\frac{3}{4}$ d., £52,697. 15s.  $8\frac{3}{4}$ d., £10. 10s.  $10\frac{1}{2}$ d., £1007. 15s. 8d., £780. £368. 15s.  $4\frac{1}{2}$ d.
- (16.) £2796. 15s.  $8\frac{1}{2}$ d., £39. 17s.  $0\frac{1}{2}$ d., £9. 9s.  $9\frac{3}{4}$ d., £29. 17s. 9d., £3269. 13s.  $1\frac{3}{4}$ d., £829,364. 15s. 8d., £32,796. 9s.  $5\frac{1}{2}$ d.
- (17.) £32. 19s.  $8\frac{1}{2}$ d., £5. 5s.  $5\frac{1}{2}$ d., £11. 11s.  $11\frac{1}{2}$ d., £362. 13s. 9d., £582. 8s. 7d., £63,829. 13s.  $9\frac{1}{2}$ d., £325,682. 19s.  $7\frac{3}{4}$ d.
- (18.) £596. 17s. 9d., £3965. 17s.  $8\frac{1}{2}$ d., £5682. 13s.  $8\frac{3}{4}$ d., £562,980. £0. 17s.  $8\frac{1}{2}$ d., £35. 9s. 6d., £32,967. 15s. 8d.
- (19.) £159. 17s. 9d., £3682. 9s. 7d., 19s.  $6\frac{1}{2}$ d., £529,736. 13s.  $8\frac{3}{4}$ d., £37. 13s.  $8\frac{1}{2}$ d., £568,017. 17s. 9d., £3,217,021. 9s.  $10\frac{3}{4}$ d.
- (20.) £596,908. 13s. 8d., £296,373. 18s.  $7\frac{1}{2}$ d., £23. 8s. 9d., £1000. £3,287,069. 13s.  $7\frac{1}{2}$ d., £32. 17s.  $9\frac{1}{2}$ d., £59. 18s. 9d.
- (21.) £382,673. 15s.  $9\frac{1}{2}$ d., £59. 16s. 8d., £3,729,683. 19s.  $8\frac{1}{2}$ d., £5768. £32. 18s. 10d., £2. 11s.  $11\frac{1}{2}$ d., £560. 17s. 9d.
- (22.) £37. 8s.  $10\frac{1}{2}$ d., £960. 14s.  $8\frac{3}{4}$ d., £95. 12s. 7d., £6728. 4s.  $10\frac{1}{2}$ d., £372. 8s.  $0\frac{1}{2}$ d., £6. 9s. 9d., £785. 1s.  $4\frac{1}{2}$ d.
- (23.) £308. 17s. 6d., £4876. 15s.  $3\frac{1}{2}$ d., £8670. 15s.  $11\frac{1}{2}$ d., £5119. 8s.  $8\frac{1}{2}$ d., £3,960,854. 17s. 11d., £78,084. £307. 16s.  $5\frac{1}{2}$ d.
- (24.) £285,406. 13s.  $10\frac{1}{2}$ d., £604. 17s.  $6\frac{3}{4}$ d., £37,089. 14s., £69. 12s.  $7\frac{1}{2}$ d., £790,654. 18s.  $3\frac{1}{2}$ d., £7254. 16s.  $3\frac{1}{2}$ d., £784. 17s. 11d.
- (25.) £1074. 9s.  $0\frac{1}{2}$ d., £1,033,075. 15s. 3d., £492. 4s.  $10\frac{1}{2}$ d., £11071. 6s. 9d., £9385. 14s.  $6\frac{3}{4}$ d., £8. 16s.  $10\frac{1}{2}$ d., £3726. 14s.  $9\frac{3}{4}$ d.
- (26.) £902,110. 6s. 3d., £53,642. 2s.  $2\frac{1}{2}$ d., £13,842. 0s. 6d., £49,027. 14s.  $8\frac{1}{2}$ d., £367,419. 12s.  $2\frac{1}{2}$ d., £102. 12s.  $10\frac{1}{2}$ d., 19s.  $6\frac{1}{2}$ d.
- (27.) 19s. 10d., £4004. 2s.  $0\frac{1}{2}$ d., £950. 17s.  $8\frac{1}{2}$ d., £2,012,019. 3s. 11d., £504,640. 18s.  $9\frac{3}{4}$ d., £76. 18s.  $9\frac{1}{2}$ d., £7. 15s.  $8\frac{1}{2}$ d.
- (28.) £704. 13s.  $11\frac{3}{4}$ d., £2. 19s.  $5\frac{1}{2}$ d., £10,009. 17s.  $9\frac{3}{4}$ d., £7311. 18s. 7d., £900,012. 19s.  $6\frac{1}{2}$ d., £640. 0s.  $8\frac{3}{4}$ d., 11 $\frac{1}{2}$ d.
- (29.) £302. 19s. 11d., £4690. 17s.  $2\frac{3}{4}$ d., £13,546. 13s. 9d., £4509. 17s.  $7\frac{3}{4}$ d., £67,780. 6s.  $6\frac{1}{2}$ d., £92. 12s.  $7\frac{1}{2}$ d., £7. 15s.  $9\frac{1}{2}$ d.
- (30.) £365. 8s.  $9\frac{1}{2}$ d., £90,002. 4s.  $7\frac{3}{4}$ d., £7. 9s.  $6\frac{1}{2}$ d., £45. 8s. 10d., £74,928. 5s.  $6\frac{1}{2}$ d., £3. 3s.  $8\frac{3}{4}$ d., 17s.  $9\frac{3}{4}$ d.

## COMPOUND SUBTRACTION.

**COMPOUND SUBTRACTION** is the operation of finding the difference between two compound numbers of the same kind.

Proof :—Add the Subtrahend to the Remainder, and the result should be the same as the Minuend.

Example.

| $\pounds$  | $s.$      | $d.$      |                    |
|------------|-----------|-----------|--------------------|
| 519        | 10        | 6½        | <i>Minuend.</i>    |
| 58         | 17        | 9½        | <i>Subtrahend.</i> |
| <u>460</u> | <u>12</u> | <u>8½</u> | <i>Remainder.</i>  |

Proof.

|            |           |           |                    |
|------------|-----------|-----------|--------------------|
| $\pounds$  | $s.$      | $d.$      |                    |
| 460        | 12        | 8½        | <i>Remainder.</i>  |
| 58         | 17        | 9½        | <i>Subtrahend.</i> |
| <u>519</u> | <u>10</u> | <u>6½</u> | <i>Minuend.</i>    |

### Exercise 24.

| (1.)      |          | (2.)     |           | (3.)      |          |
|-----------|----------|----------|-----------|-----------|----------|
| $\pounds$ | $s.$     | $d.$     | $\pounds$ | $s.$      | $d.$     |
| 87        | 12       | 10       | 49        | 18        | 8        |
| <u>16</u> | <u>9</u> | <u>2</u> | <u>35</u> | <u>10</u> | <u>4</u> |

| (6.)      |          | (7.)     |           | (8.)     |          |
|-----------|----------|----------|-----------|----------|----------|
| $\pounds$ | $s.$     | $d.$     | $\pounds$ | $s.$     | $d.$     |
| 70        | 8        | 8        | 78        | 13       | 8        |
| <u>11</u> | <u>5</u> | <u>3</u> | <u>14</u> | <u>6</u> | <u>3</u> |

| (10.)      |          | (11.)    |           | (12.)    |           |
|------------|----------|----------|-----------|----------|-----------|
| $\pounds$  | $s.$     | $d.$     | $\pounds$ | $s.$     | $d.$      |
| 604        | 12       | 6½       | 178       | 14       | 10½       |
| <u>148</u> | <u>7</u> | <u>5</u> | <u>39</u> | <u>8</u> | <u>4½</u> |

| (14.)      |          | (15.)     |            | (16.)    |           |
|------------|----------|-----------|------------|----------|-----------|
| $\pounds$  | $s.$     | $d.$      | $\pounds$  | $s.$     | $d.$      |
| 436        | 17       | 6         | 440        | 7        | 8         |
| <u>117</u> | <u>4</u> | <u>2½</u> | <u>199</u> | <u>3</u> | <u>6½</u> |

| (18.)      |          | (19.)     |           | (20.)    |          |
|------------|----------|-----------|-----------|----------|----------|
| $\pounds$  | $s.$     | $d.$      | $\pounds$ | $s.$     | $d.$     |
| 706        | 18       | 7½        | 515       | 18       | 0½       |
| <u>197</u> | <u>8</u> | <u>2½</u> | <u>74</u> | <u>3</u> | <u>6</u> |

| (22.) |    |                 | (23.) |    |                  | (24.) |    |                 | (25.) |    |                 |
|-------|----|-----------------|-------|----|------------------|-------|----|-----------------|-------|----|-----------------|
| £     | s. | d.              | £     | s. | d.               | £     | s. | d.              | £     | s. | d.              |
| 70    | 19 | 5 $\frac{1}{2}$ | 486   | 11 | 5 $\frac{1}{2}$  | 4019  | 2  | 8 $\frac{1}{2}$ | 6704  | 5  | 11              |
| 94    | 18 | 7 $\frac{1}{2}$ | 117   | 6  | 11 $\frac{3}{4}$ | 1640  | 18 | 2               | 1296  | 19 | 3 $\frac{1}{4}$ |

| (26.) |    |                 | (27.) |    |                  | (28.) |    |                 | (29.) |    |    |
|-------|----|-----------------|-------|----|------------------|-------|----|-----------------|-------|----|----|
| £     | s. | d.              | £     | s. | d.               | £     | s. | d.              | £     | s. | d. |
| 58    | 10 | 4               | 7412  | 12 | 10 $\frac{1}{4}$ | 1004  | 18 | 7 $\frac{1}{4}$ | 8760  | 2  | 5  |
| 19    | 15 | 2 $\frac{3}{4}$ | 4970  | 13 | 2 $\frac{1}{2}$  | 706   | 19 | 3 $\frac{1}{4}$ | 1096  | 5  | 10 |

| (30.) |    |                 | (31.) |    |                 | (32.) |    |                  | (33.)  |    |                 |
|-------|----|-----------------|-------|----|-----------------|-------|----|------------------|--------|----|-----------------|
| £     | s. | d.              | £     | s. | d.              | £     | s. | d.               | £      | s. | d.              |
| 24    | 17 | 2 $\frac{1}{2}$ | 1907  | 18 | 2 $\frac{1}{4}$ | 4307  | 0  | 8                | 59,012 | 2  | 8 $\frac{1}{2}$ |
| 17    | 17 | 6               | 1420  | 19 | 7               | 698   | 13 | 10 $\frac{1}{2}$ | 40,704 | 16 | 3 $\frac{1}{2}$ |

| £     | s.       | d.    | £                          | s. | d.               |
|-------|----------|-------|----------------------------|----|------------------|
| (34.) | £806,940 | 14 10 | - £178,530                 | 18 | 2 $\frac{1}{2}$  |
| (35.) | £920,307 | 11    | 2 $\frac{1}{4}$ - £853,209 | 17 | 8 $\frac{3}{4}$  |
| (36.) | £107,248 | 4     | 0 $\frac{1}{4}$ - £92,309  | 13 | 7 $\frac{1}{2}$  |
| (37.) | £728,200 | 19    | 6 $\frac{1}{4}$ - £109,307 | 2  | 11               |
| (38.) | £666,729 | 13    | 9 $\frac{1}{4}$ - £217,071 | 19 | 9 $\frac{1}{2}$  |
| (39.) | £241,307 | 16    | 1 $\frac{1}{2}$ - £108,740 | 17 | 10 $\frac{3}{4}$ |
| (40.) | £94,618  | 17    | 6 - £49,816                | 18 | 9 $\frac{1}{4}$  |
| (41.) | £450,723 | 1     | 8 $\frac{3}{4}$ - £138,019 | 7  | 11               |
| (42.) | £508,017 | 12    | 10 - £241,960              | 18 | 2 $\frac{1}{2}$  |
| (43.) | £100,000 | 2     | 8 - £9,090                 | 13 | 2 $\frac{1}{2}$  |
| (44.) | £706,950 | 13    | 8 - £187,740               | 19 | 3 $\frac{1}{4}$  |
| (45.) | £840,703 | 10    | 3 $\frac{1}{4}$ - £735,408 | 16 | 7 $\frac{1}{2}$  |
| (46.) | £106,428 | 5     | 0 $\frac{1}{2}$ - £93,409  | 14 | 8 $\frac{1}{4}$  |
| (47.) | £837,400 | 18    | 7 $\frac{1}{4}$ - £108,750 | 4  | 9                |
| (48.) | £777,645 | 14    | 8 $\frac{1}{4}$ - £317,091 | 19 | 9 $\frac{3}{4}$  |
| (49.) | £341,703 | 17    | 1 $\frac{1}{4}$ - £209,650 | 18 | 11 $\frac{1}{2}$ |
| (50.) | £84,615  | 12    | 6 - £49,816                | 13 | 7 $\frac{1}{2}$  |
| (51.) | £540,327 | 2     | 7 $\frac{1}{2}$ - £157,018 | 6  | 10               |
| (52.) | £609,016 | 11    | 11 - £251,680              | 17 | 2 $\frac{1}{2}$  |
| (53.) | £200,000 | 3     | 6 - £19,070                | 14 | 3 $\frac{1}{2}$  |
| (54.) | £507,640 | 12    | 9 - £394,250               | 18 | 3 $\frac{1}{2}$  |
| (55.) | £530,407 | 12    | 3 $\frac{1}{2}$ - £145,607 | 17 | 7 $\frac{1}{2}$  |
| (56.) | £105,567 | 6     | 0 $\frac{1}{4}$ - £94,708  | 15 | 9 $\frac{1}{4}$  |
| (57.) | £738,600 | 16    | 4 $\frac{1}{4}$ - £209,860 | 5  | 8                |
| (58.) | £888,437 | 15    | 9 $\frac{1}{4}$ - £428,083 | 18 | 8 $\frac{3}{4}$  |
| (59.) | £451,802 | 16    | 2 $\frac{1}{2}$ - £308,560 | 17 | 9 $\frac{1}{2}$  |
| (60.) | £64,917  | 11    | 8 - £48,926                | 14 | 9 $\frac{1}{2}$  |
| (61.) | £640,732 | 3     | 6 $\frac{1}{4}$ - £257,019 | 8  | 10               |
| (62.) | £709,016 | 10    | 9 - £151,960               | 18 | 3 $\frac{1}{2}$  |

|                |    |                                    |   |          |    |                                    |
|----------------|----|------------------------------------|---|----------|----|------------------------------------|
| (63.) £101,000 | 4  | 7                                  | - | £9,087   | 15 | 3 <i><math>\frac{1}{4}</math></i>  |
| (64.) £300,640 | 14 | 1 <i><math>\frac{1}{2}</math></i>  | - | £102,607 | 6  | 7 <i><math>\frac{1}{4}</math></i>  |
| (65.) £411,079 | 11 | 2                                  | - | £201,985 | 7  | 10 <i><math>\frac{1}{4}</math></i> |
| (66.) £70,204  | 9  | 10                                 | - | £9,890   | 17 | 2 <i><math>\frac{1}{4}</math></i>  |
| (67.) £607,052 | 11 | 10 <i><math>\frac{1}{2}</math></i> | - | £40,207  | 15 | 1 <i><math>\frac{1}{4}</math></i>  |
| (68.) £91,360  | 18 | 9 <i><math>\frac{1}{2}</math></i>  | - | £2,090   | 2  | 11                                 |
| (69.) £710,408 | 2  | 10 <i><math>\frac{1}{2}</math></i> | - | £90,850  | 16 | 3                                  |
| (70.) £209,017 | 10 | 6 <i><math>\frac{1}{4}</math></i>  | - | £160,869 | 11 | 3 <i><math>\frac{1}{4}</math></i>  |

**Exercise 25.**

- (1.) Find the difference between ten pounds and half a crown.
- (2.) Find the difference between £100 and half a sovereign?
- (3.) Take 3 *$\frac{3}{4}$ d.* from £3000.
- (4.) Find the difference between £300 and 7s. 4 *$\frac{1}{2}$ d.*
- (5.) How much greater is £50 than £7. 9s. 8 *$\frac{1}{2}$ d.*?
- (6.) What sum added to 9s. 8 *$\frac{1}{2}$ d.* makes a sovereign?
- (7.) How much less is £70. 0s. 7 *$\frac{1}{2}$ d.* than £700?
- (8.) Take 7s. 10 *$\frac{1}{2}$ d.* from £1000.
- (9.) Find the difference between £60. 5s. and one farthing.
- (10.) How much greater is £400 than £40. 0s. 0 *$\frac{1}{2}$ d.*?
- (11.) What sum added to £1. 0s. 1d. makes £5?
- (12.) How much less is £5. 0s. 5 *$\frac{1}{2}$ d.* than £50?
- (13.) Take 1 *$\frac{1}{2}$ d.* from £100.
- (14.) Find the difference between £1000 and 19s. 11 *$\frac{3}{4}$ d.*?
- (15.) How much greater is £1 than one farthing?
- (16.) What sum added to half-a-crown makes £9. 0s. 0 *$\frac{1}{2}$ d.*?
- (17.) How much less is £98. 7s. 6 *$\frac{1}{2}$ d.* than £1500?
- (18.) I got 9s. 4 *$\frac{1}{2}$ d.* of change out of a ten-pound note : what did I spend?
- (19.) A man earns £200 a year, and spends £150. 17s. 6d. : what does he save?
- (20.) A horse and cart cost £170 : the cart is worth £40. 10s. 6d. : what is the price of the horse?
- (21.) Take 1 *$\frac{1}{2}$ d.* from £10,000.
- (22.) If I send a £5 note to pay a bill of £3. 19s. 6d., what change should I receive?
- (23.) A man earns £210 a year, and spends £148. 17s. 2d. : how much a year does he save?

- (24.) A house and field cost £968. 17s. 8d.; the field cost £603. 0s. 10d.: what was the cost of the house?
- (25.) My railway fare was 17s.  $3\frac{1}{2}$ d., and I put down a sovereign: what change did I receive?
- (26.) A man earns £2 a week, and spends 9s.  $4\frac{1}{2}$ d.: what does he save every week?
- (27.) What sum added to £9. 17s.  $6\frac{1}{2}$ d. will make £500?
- (28.) Take £309. 10s.  $4\frac{3}{4}$ d. from £1000.
- (29.) From £10,000 take £90. 10s.  $0\frac{1}{4}$ d.
- (30.) Subtract £990. 17s.  $1\frac{1}{2}$ d. from £8,075. 13s. 4d.
- 

## COMPOUND MULTIPLICATION.

COMPOUND MULTIPLICATION is the operation of finding what a compound number will amount to when repeated a given number of times.

Example 1. When the multiplier does not exceed 12.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 6,098 \quad 17 \quad 5\frac{3}{4} \times 8 \\ \hline 8 \end{array}$$

*Ans.* 48,790 19 10

## Exercise 26.

$$\begin{array}{r} (1.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 34 \quad 7 \quad 5\frac{1}{4} \\ \hline 2 \end{array}$$

$$\begin{array}{r} (2.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 48 \quad 5 \quad 4\frac{1}{2} \\ \hline 2 \end{array}$$

$$\begin{array}{r} (3.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 57 \quad 9 \quad 3\frac{1}{4} \\ \hline 2 \end{array}$$

$$\begin{array}{r} (4.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 12 \quad 5 \quad 2\frac{1}{4} \\ \hline 3 \end{array}$$

$$\begin{array}{r} (5.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 29 \quad 4 \quad 1\frac{1}{2} \\ \hline 3 \end{array}$$

$$\begin{array}{r} (6.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 73 \quad 6 \quad 3\frac{1}{4} \\ \hline 3 \end{array}$$

$$\begin{array}{r} (7.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 10 \quad 4 \quad 6\frac{1}{2} \\ \hline 4 \end{array}$$

$$\begin{array}{r} (8.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 36 \quad 3 \quad 10\frac{1}{4} \\ \hline 4 \end{array}$$

$$\begin{array}{r} (9.) \\ \text{£} \quad \text{s.} \quad \text{d.} \\ 89 \quad 0 \quad 7\frac{1}{4} \\ \hline \end{array}$$

$$(10.) \quad \begin{array}{r} \text{£} \\ 17 \\ 6 \\ 2\frac{1}{2} \\ \hline 5 \end{array}$$

$$(11.) \quad \begin{array}{r} \text{£} \\ 46 \\ 7 \\ 6 \\ \hline 5 \end{array}$$

$$(12.) \quad \begin{array}{r} \text{£} \\ 12 \\ 8 \\ 4\frac{1}{2} \\ \hline 5 \end{array}$$

$$(13.) \quad \begin{array}{r} \text{£} \\ 55 \\ 10 \\ 8\frac{1}{2} \\ \hline 6 \end{array}$$

$$(14.) \quad \begin{array}{r} \text{£} \\ 73 \\ 11 \\ 2\frac{1}{2} \\ \hline 6 \end{array}$$

$$(15.) \quad \begin{array}{r} \text{£} \\ 99 \\ 12 \\ 7 \\ \hline 6 \end{array}$$

$$(16.) \quad \begin{array}{r} \text{£} \\ 38 \\ 7 \\ 6\frac{1}{2} \\ \hline 7 \end{array}$$

$$(17.) \quad \begin{array}{r} \text{£} \\ 67 \\ 13 \\ 1\frac{1}{2} \\ \hline 7 \end{array}$$

$$(18.) \quad \begin{array}{r} \text{£} \\ 29 \\ 12 \\ 10 \\ \hline 7 \end{array}$$

$$(19.) \quad \begin{array}{r} \text{£} \\ 78 \\ 14 \\ 3\frac{3}{4} \\ \hline 8 \end{array}$$

$$(20.) \quad \begin{array}{r} \text{£} \\ 88 \\ 15 \\ 8 \\ \hline 8 \end{array}$$

$$(21.) \quad \begin{array}{r} \text{£} \\ 42 \\ 18 \\ 3\frac{1}{2} \\ \hline 8 \end{array}$$

$$(22.) \quad \begin{array}{r} \text{£} \\ 72 \\ 12 \\ 9\frac{1}{4} \\ \hline 9 \end{array}$$

$$(23.) \quad \begin{array}{r} \text{£} \\ 35 \\ 18 \\ 6\frac{1}{4} \\ \hline 9 \end{array}$$

$$(24.) \quad \begin{array}{r} \text{£} \\ 89 \\ 9 \\ 11\frac{1}{2} \\ \hline 9 \end{array}$$

$$(25.) \quad \begin{array}{r} \text{£} \\ 17 \\ 16 \\ 5\frac{1}{2} \\ \hline 10 \end{array}$$

$$(26.) \quad \begin{array}{r} \text{£} \\ 85 \\ 18 \\ 7\frac{1}{2} \\ \hline 10 \end{array}$$

$$(27.) \quad \begin{array}{r} \text{£} \\ 50 \\ 10 \\ 11 \\ \hline 10 \end{array}$$

$$(28.) \quad \begin{array}{r} \text{£} \\ 46 \\ 11 \\ 6\frac{1}{2} \\ \hline 11 \end{array}$$

$$(29.) \quad \begin{array}{r} \text{£} \\ 19 \\ 15 \\ 8\frac{1}{4} \\ \hline 11 \end{array}$$

$$(30.) \quad \begin{array}{r} \text{£} \\ 66 \\ 19 \\ 2\frac{1}{2} \\ \hline 11 \end{array}$$

$$(31.) \quad \begin{array}{r} \text{£} \\ 29 \\ 13 \\ 8\frac{1}{2} \\ \hline 12 \end{array}$$

$$(32.) \quad \begin{array}{r} \text{£} \\ 18 \\ 15 \\ 11 \\ \hline 12 \end{array}$$

$$(33.) \quad \begin{array}{r} \text{£} \\ 90 \\ 18 \\ 3\frac{1}{2} \\ \hline 12 \end{array}$$

(34.) Multiply £93. 13s. 8 *$\frac{1}{4}$* d. by 6.

(35.) How much is seven times £34. 9s. 5 *$\frac{1}{2}$* d.?

(36.) Multiply £28. 17s. 6 *$\frac{3}{4}$* d. by 8.

- (37.) Multiply £86. 14s. 5d. by 9.  
 (38.) Find the amount of ten times £83. 15s. 6½d.  
 (39.) Multiply £35. 2s. 4¾d. by 11.  
 (40.) How much is twelve times £74. 18s. 11¾d.?  
 (41.) £190. 0s. 8¾d. × 6, 7, 8.  
 (42.) £945. 8s. 0½d. × 7, 8, 9.  
 (43.) £45. 18s. 7⅓d. × 6, 7, 8, 9.  
 (44.) £69. 19s. 0⅓d. × 7, 8, 9, 10.  
 (45.) £164. 0s. 11⅓d. × 8, 9, 10, 11.  
 (46.) £607. 19s. 0⅓d. × 9, 10, 11, 12.  
 (47.) £963. 14s. 8⅓d. × 9, 10, 11, 12.  
 (48.) £96. 18s. 0⅓d. × 7, 8, 9, 10.  
 (49.) £640. 15s. 8⅓d. × 9, 10, 11, 12.  
 (50.) £769. 15s. 9⅓d. × 9, 10, 11, 12.

Example 2. When the multiplier exceeds 12, and can be resolved into two factors.

$$\begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 6,098 \quad 17 \quad 5\frac{3}{4} \times 32 \\
 \hline
 & & 8 \\
 & & \overline{48,790 \quad 19 \quad 10} \\
 & & 4 \\
 \text{Ans.} \quad & \overline{195,163 \quad 19 \quad 4}
 \end{array}$$

### Exercise 27.

Work the following Exercises (using factors):—

|          | £   | s. | d.   |                |
|----------|-----|----|--|----------------|
| (1-8.)   | 67  | 9  | $8\frac{1}{2} \times 14, 15, 16, 18, 20,$  | 21, 22, 24.    |
| (9-16.)  | 98  | 17 | $0\frac{1}{2} \times 25, 27, 28, 30, 32,$  | 33, 36, 40.    |
| (17-24.) | 70  | 19 | $11\frac{1}{2} \times 42, 44, 45, 48, 50,$ | 54, 55, 56.    |
| (25-32.) | 98  | 0  | $6\frac{1}{2} \times 60, 63, 64, 66, 70,$  | 72, 77, 80.    |
| (33-40.) | 364 | 17 | $6\frac{1}{2} \times 81, 84, 88, 90, 96,$  | 110, 121, 144. |
| (41-48.) | 89  | 7  | $6\frac{1}{2} \times 14, 15, 16, 18, 20,$  | 21, 22, 24.    |
| (49-56.) | 99  | 18 | $10\frac{1}{2} \times 42, 44, 45, 48, 50,$ | 54, 55, 56.    |
| (57-64.) | 86  | 15 | $0\frac{1}{2} \times 60, 63, 64, 66, 70,$  | 72, 77, 80.    |
| (65-72.) | 768 | 18 | $9\frac{1}{2} \times 81, 84, 88, 90, 96,$  | 110, 121, 144. |
| (73-80.) | 76  | 18 | $0\frac{1}{2} \times 25, 27, 28, 30, 32,$  | 33, 36, 40.    |
| (81-88.) | 69  | 14 | $0\frac{1}{2} \times 60, 63, 64, 66, 70$   | 72, 77, 80.    |
| (89-96.) | 967 | 19 | $4\frac{1}{2} \times 81, 84, 88, 90, 96$   | 110, 121, 144. |

Example 3. When the multiplier exceeds 12, and cannot be resolved into factors.

$$\begin{array}{r}
 \frac{\text{£} \quad \text{s.} \quad \text{d.}}{23 \quad 13 \quad 7\frac{1}{2} \times 59} \\
 \hline
 & & 8 \\
 189 & 9 & 0 \\
 & & 7 \\
 \hline
 1326 & 3 & 0 \\
 71 & 0 & 10\frac{1}{2} = \text{top line} \times 3 \\
 \hline
 \text{Ans. } & \underline{1397} & \underline{3} \underline{10\frac{1}{2}}
 \end{array}$$

### Exercise 28.

|       | $\frac{\text{£}}{s.} \quad \frac{\text{s.}}{d.}$ | $\frac{\text{d.}}{s. \times d.}$ |                           |  | $\frac{\text{£}}{s.} \quad \frac{\text{s.}}{d.}$ | $\frac{\text{d.}}{s. \times d.}$ |    |                            |
|-------|--|----------------------------------|---------------------------|--|--|----------------------------------|----|----------------------------|
| (1.)  | 94   | 10                               | $7\frac{1}{2} \times 13$  |  | (30.)  | 267                              | 17 | $5\frac{1}{2} \times 69$   |
| (2.)  | 174  | 3                                | $10\frac{1}{2} \times 14$ |  | (31.)  | 94                               | 10 | $7\frac{1}{2} \times 34$   |
| (3.)  | 798  | 7                                | $6\frac{1}{2} \times 15$  |  | (32.)  | 174                              | 3  | $10\frac{1}{2} \times 65$  |
| (4.)  | 65   | 11                               | $8\frac{1}{2} \times 16$  |  | (33.)  | 798                              | 7  | $6\frac{1}{2} \times 37$   |
| (5.)  | 710  | 6                                | $3\frac{1}{2} \times 17$  |  | (34.)  | 65                               | 11 | $8\frac{1}{2} \times 23$   |
| (6.)  | 309  | 16                               | $9\frac{1}{2} \times 13$  |  | (35.)  | 710                              | 6  | $3\frac{1}{2} \times 39$   |
| (7.)  | 57   | 13                               | $4\frac{1}{2} \times 14$  |  | (36.)  | 309                              | 16 | $9\frac{1}{2} \times 23$   |
| (8.)  | 378  | 17                               | $2\frac{1}{2} \times 15$  |  | (37.)  | 57                               | 13 | $4\frac{1}{2} \times 65$   |
| (9.)  | 875  | 19                               | $10\frac{1}{2} \times 16$ |  | (38.)  | 378                              | 17 | $2\frac{1}{2} \times 34$   |
| (10.) | 532  | 15                               | $11 \times 17$            |  | (39.)  | 875                              | 19 | $10\frac{1}{2} \times 87$  |
| (11.) | 908  | 16                               | $5\frac{1}{2} \times 13$  |  | (40.)  | 532                              | 15 | $11 \times 46$             |
| (12.) | 36   | 8                                | $4 \times 14$             |  | (41.)  | 908                              | 16 | $5\frac{1}{2} \times 37$   |
| (13.) | 333  | 3                                | $3\frac{1}{2} \times 15$  |  | (42.)  | 36                               | 8  | $4 \times 53$              |
| (14.) | 764  | 15                               | $7\frac{1}{2} \times 16$  |  | (43.)  | 333                              | 3  | $3\frac{1}{2} \times 34$   |
| (15.) | 267  | 17                               | $5\frac{1}{2} \times 17$  |  | (44.)  | 764                              | 15 | $7\frac{1}{2} \times 59$   |
| (16.) | 94   | 10                               | $7\frac{1}{2} \times 23$  |  | (45.)  | 267                              | 17 | $5\frac{1}{2} \times 46$   |
| (17.) | 174  | 3                                | $10\frac{1}{2} \times 43$ |  | (46.)  | 590                              | 11 | $8\frac{1}{2} \times 97$   |
| (18.) | 798  | 7                                | $6\frac{1}{2} \times 46$  |  | (47.)  | 970                              | 14 | $10\frac{1}{2} \times 89$  |
| (19.) | 65   | 11                               | $8\frac{1}{2} \times 67$  |  | (48.)  | 905                              | 7  | $4\frac{1}{2} \times 85$   |
| (20.) | 710  | 6                                | $3\frac{1}{2} \times 87$  |  | (49.)  | 970                              | 14 | $10\frac{1}{2} \times 43$  |
| (21.) | 309  | 16                               | $9\frac{1}{2} \times 37$  |  | (50.)  | 905                              | 7  | $4\frac{1}{2} \times 67$   |
| (22.) | 57   | 13                               | $4\frac{1}{2} \times 53$  |  | (51.)  | 817                              | 6  | $0\frac{1}{2} \times 122$  |
| (23.) | 378  | 17                               | $2\frac{1}{2} \times 59$  |  | (52.)  | 736                              | 18 | $4\frac{1}{2} \times 145$  |
| (24.) | 875  | 19                               | $10\frac{1}{2} \times 39$ |  | (53.)  | 736                              | 18 | $2\frac{1}{2} \times 113$  |
| (25.) | 532  | 15                               | $11 \times 85$            |  | (54.)  | 905                              | 7  | $4\frac{1}{2} \times 107$  |
| (26.) | 908  | 16                               | $5\frac{1}{2} \times 38$  |  | (55.)  | 970                              | 14 | $10\frac{1}{2} \times 109$ |
| (27.) | 36   | 8                                | $4 \times 95$             |  | (56.)  | 23                               | 14 | $7\frac{1}{2} \times 123$  |
| (28.) | 333  | 3                                | $3\frac{1}{2} \times 29$  |  | (57.)  | 75                               | 16 | $8\frac{1}{2} \times 157$  |
| (29.) | 764  | 15                               | $7\frac{1}{2} \times 37$  |  | (58.)  | 83                               | 17 | $6\frac{1}{2} \times 174$  |

|       | £   | s. | d.                      |        | £   | s. | d.                       |
|-------|-----|----|-------------------------|--------|-----|----|--------------------------|
| (59.) | 76  | 10 | 0 $\frac{1}{2}$ × 257.  | (90.)  | 79  | 18 | 11 $\frac{1}{2}$ × 568.  |
| (60.) | 62  | 19 | 11 $\frac{1}{2}$ × 484. | (91.)  | 47  | 14 | 8 $\frac{1}{2}$ × 847.   |
| (61.) | 89  | 13 | 10 $\frac{1}{2}$ × 753. | (92.)  | 32  | 16 | 8 $\frac{1}{2}$ × 217.   |
| (62.) | 72  | 15 | 8 $\frac{1}{2}$ × 871.  | (93.)  | 639 | 12 | 9 $\frac{1}{2}$ × 718.   |
| (63.) | 456 | 13 | 11 $\frac{1}{2}$ × 937. | (94.)  | 408 | 16 | 10 $\frac{1}{2}$ × 471.  |
| (64.) | 709 | 11 | 10 $\frac{1}{2}$ × 619. | (95.)  | 371 | 0  | 7 $\frac{1}{2}$ × 269.   |
| (65.) | 371 | 0  | 9 $\frac{1}{2}$ × 578.  | (96.)  | 23  | 14 | 7 $\frac{1}{2}$ × 154.   |
| (66.) | 73  | 17 | 8 $\frac{1}{2}$ × 123.  | (97.)  | 75  | 16 | 8 $\frac{1}{2}$ × 179.   |
| (67.) | 87  | 13 | 9 $\frac{1}{2}$ × 157.  | (98.)  | 83  | 17 | 6 $\frac{1}{2}$ × 183.   |
| (68.) | 92  | 16 | 5 $\frac{1}{2}$ × 174.  | (99.)  | 76  | 10 | 0 $\frac{1}{2}$ × 456.   |
| (69.) | 35  | 11 | 0 $\frac{1}{2}$ × 257.  | (100.) | 62  | 19 | 11 $\frac{1}{2}$ × 376.  |
| (70.) | 79  | 18 | 11 $\frac{1}{2}$ × 484. | (101.) | 89  | 13 | 10 $\frac{1}{2}$ × 749.  |
| (71.) | 47  | 14 | 8 $\frac{1}{2}$ × 753.  | (102.) | 72  | 15 | 8 $\frac{1}{2}$ × 465.   |
| (72.) | 32  | 16 | 8 $\frac{1}{2}$ × 871.  | (103.) | 594 | 17 | 6 $\frac{1}{2}$ × 300.   |
| (73.) | 639 | 12 | 9 $\frac{1}{2}$ × 937.  | (104.) | 706 | 14 | 8 $\frac{1}{2}$ × 600.   |
| (74.) | 408 | 16 | 10 $\frac{1}{2}$ × 619. | (105.) | 894 | 16 | 0 $\frac{1}{2}$ × 900.   |
| (75.) | 371 | 0  | 7 $\frac{1}{2}$ × 578.  | (106.) | 728 | 13 | 10 $\frac{1}{2}$ × 109.  |
| (76.) | 23  | 14 | 7 $\frac{1}{2}$ × 148.  | (107.) | 317 | 0  | 0 $\frac{1}{2}$ × 101.   |
| (77.) | 75  | 16 | 8 $\frac{1}{2}$ × 165.  | (108.) | 72  | 14 | 8 $\frac{1}{2}$ × 210.   |
| (78.) | 83  | 17 | 6 $\frac{1}{2}$ × 159.  | (109.) | 17  | 18 | 10 $\frac{1}{2}$ × 630.  |
| (79.) | 76  | 10 | 0 $\frac{1}{2}$ × 389.  | (110.) | 65  | 11 | 9 $\frac{1}{2}$ × 750.   |
| (80.) | 62  | 19 | 11 $\frac{1}{2}$ × 568. | (111.) | 283 | 17 | 0 $\frac{1}{2}$ × 790.   |
| (81.) | 89  | 13 | 10 $\frac{1}{2}$ × 847. | (112.) | 450 | 0  | 7 $\frac{1}{2}$ × 1000.  |
| (82.) | 72  | 15 | 8 $\frac{1}{2}$ × 217.  | (113.) | 148 | 13 | 10 $\frac{1}{2}$ × 4000. |
| (83.) | 456 | 13 | 11 $\frac{1}{2}$ × 718. | (114.) | 15  | 6  | 7 $\frac{1}{2}$ × 2003.  |
| (84.) | 709 | 11 | 10 $\frac{1}{2}$ × 471. | (115.) | 35  | 0  | 9 $\frac{1}{2}$ × 5007.  |
| (85.) | 371 | 0  | 9 $\frac{1}{2}$ × 269.  | (116.) | 67  | 10 | 0 $\frac{1}{2}$ × 8400.  |
| (86.) | 73  | 17 | 8 $\frac{1}{2}$ × 148.  | (117.) | 48  | 7  | 6 $\frac{1}{2}$ × 9070.  |
| (87.) | 87  | 13 | 9 $\frac{1}{2}$ × 165.  | (118.) | 16  | 4  | 2 $\frac{1}{2}$ × 2106.  |
| (88.) | 92  | 16 | 5 $\frac{1}{2}$ × 159.  | (119.) | 273 | 16 | 8 $\frac{1}{2}$ × 4076.  |
| (89.) | 35  | 11 | 0 $\frac{1}{2}$ × 389.  | (120.) | 169 | 14 | 9 $\frac{1}{2}$ × 3049.  |

- 121.) Multiply 6s. 5d. by 36.
- 122.) A man pays £240. 15s. 5d. per week in wages : what does he pay in a year ?
- 123.) A man has 17 houses repaired at a cost of £15. 10s. 4 $\frac{1}{2}$ d. each : what does his bill amount to ?
- 124.) How much rent will a man receive from 37 houses at a rent of £40. 8s. 6d. each ?
- 125.) A shopkeeper takes in £78. 12s. 0 $\frac{1}{2}$ d. every week : what does he receive in a year ?
- 126.) If a boy puts 1716 on his slate 17 times, and adds them up, what is his answer ?

- (127.) A butcher buys 58 sheep at £4. 6s.  $7\frac{1}{2}$ d. each : what does he give for them all ?
- (128.) A man can earn £1. 0s.  $9\frac{1}{2}$ d. a day : how much is that for a year of 365 days ?
- (129.) What should be paid for 24 pairs of boots at 17s. 6d. per pair ?
- (130.) What is the rent of 84 acres of land at £3. 7s. 6d. per acre ?

## COMPOUND DIVISION.

COMPOUND DIVISION is the operation of dividing a compound number by an abstract number, or of finding how often one compound number is contained in another of the same kind.

Example 1. When the divisor does not exceed 12.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 2) \underline{7,408 \ 11 \ 6\frac{1}{2}} \div 2 \\ \underline{3,704 \ 5 \ 9\frac{1}{2}} \end{array}$$

*Ans.* £3,704. 5s.  $9\frac{1}{2}$ d.

Proof :—Multiply the answer by the given divisor, and the result should be the dividend.

### Exercise 29.

(1.) 2) £78 18 10 $\frac{1}{2}$

(2.) 2) £42 12 9

(3.) 2) £15 4 7 $\frac{1}{2}$

(4.) 3) £93 15 6 $\frac{1}{2}$

(5.) 3) £78 14 6

(6.) 3) £43 4 4 $\frac{1}{2}$

(7.) 4) £84 16 8

(8.) 4) £32 14 4

(9.) 4) £19 2 2

(10.) 5) £75 10 10

(11.) 5) £90 18 4

(12.) 5) £23 12 7 $\frac{1}{2}$

(13.) 6) £726 18 6

(14.) 6) £168 15 6

(15.) 6) £411 2 9

$$\begin{array}{r} \text{(16.)} \\ 7) \underline{364} \quad \underline{8} \quad \underline{2} \end{array}$$

$$\begin{array}{r} \text{(17.)} \\ 7) \underline{805} \quad \underline{16} \quad \underline{4} \end{array}$$

$$\begin{array}{r} \text{(18.)} \\ 7) \underline{498} \quad \underline{10} \quad \underline{0\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(19.)} \\ 8) \underline{912} \quad \underline{17} \quad \underline{6} \end{array}$$

$$\begin{array}{r} \text{(20.)} \\ 8) \underline{146} \quad \underline{9} \quad \underline{4} \end{array}$$

$$\begin{array}{r} \text{(21.)} \\ 8) \underline{311} \quad \underline{16} \quad \underline{0\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(22.)} \\ 9) \underline{658} \quad \underline{8} \quad \underline{6} \end{array}$$

$$\begin{array}{r} \text{(23.)} \\ 9) \underline{709} \quad \underline{14} \quad \underline{2\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(24.)} \\ 9) \underline{276} \quad \underline{0} \quad \underline{11\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(25.)} \\ 10) \underline{4387} \quad \underline{6} \quad \underline{5} \end{array}$$

$$\begin{array}{r} \text{(26.)} \\ 10) \underline{2004} \quad \underline{10} \quad \underline{2\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(27.)} \\ 10) \underline{8460} \quad \underline{4} \quad \underline{2} \end{array}$$

$$\begin{array}{r} \text{(28.)} \\ 11) \underline{8844} \quad \underline{5} \quad \underline{6} \end{array}$$

$$\begin{array}{r} \text{(29.)} \\ 11) \underline{3174} \quad \underline{18} \quad \underline{2\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(30.)} \\ 11) \underline{7386} \quad \underline{0} \quad \underline{10} \end{array}$$

$$\begin{array}{r} \text{(31.)} \\ 12) \underline{3732} \quad \underline{18} \quad \underline{6} \end{array}$$

$$\begin{array}{r} \text{(32.)} \\ 12) \underline{1000} \quad \underline{4} \quad \underline{9\frac{1}{2}} \end{array}$$

$$\begin{array}{r} \text{(33.)} \\ 12) \underline{9009} \quad \underline{10} \quad \underline{9} \end{array}$$

|          | $\text{£}$ | s. | d.                               |
|----------|------------|----|----------------------------------|
| (34-36.) | 8,076      | 9  | $4\frac{3}{4} \div 2$ , 3, 4.    |
| (37-39.) | 809        | 7  | $8\frac{1}{2} \div 5$ , 6, 7.    |
| (40-42.) | 1,906      | 8  | $3\frac{1}{2} \div 6$ , 7, 8.    |
| (43-45.) | 9,084      | 17 | $8\frac{1}{2} \div 8$ , 9, 10.   |
| (46-48.) | 8,093      | 14 | $0\frac{1}{2} \div 10$ , 11, 12. |
| (49-51.) | 607        | 8  | $9\frac{1}{2} \div 5$ , 6, 7.    |
| (52-54.) | 1,709      | 9  | $3\frac{1}{2} \div 6$ , 7, 8.    |
| (55-57.) | 6,094      | 18 | $9\frac{1}{2} \div 8$ , 9, 10.   |
| (58-60.) | 90,837     | 15 | $0\frac{1}{2} \div 10$ , 11, 12. |
| (61-63.) | 807        | 9  | $8\frac{1}{2} \div 5$ , 6, 7.    |
| (64-66.) | 1,906      | 8  | $5\frac{1}{2} \div 6$ , 7, 8.    |
| (67-69.) | 9,084      | 16 | $7\frac{1}{2} \div 8$ , 9, 10.   |
| (70-72.) | 70,937     | 15 | $0\frac{1}{2} \div 10$ , 11, 12. |

Example 2. When the divisor exceeds 12, and can be resolved into two factors.

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 7) \underline{6,607} \quad \underline{11} \quad \underline{3} \quad \div 84 \\ 12) \underline{\underline{943}} \quad \underline{18} \quad \underline{9} \\ \underline{\underline{78}} \quad \underline{13} \quad \underline{2\frac{1}{2}} \end{array}$$

Ans. £78. 13s. 2 $\frac{1}{2}$ d.

### **Exercise 30.**

**Work the following exercises (using factors):**

|       | £         | s. | d.  |        | £     | s.         | d.     |
|-------|-----------|----|-----|--------|-------|------------|--------|
| (1.)  | 35,302    | 18 | 6   | ÷ 42.  | (16.) | 140,887    | 7 11   |
| (2.)  | 4,197     | 10 | 0   | ÷ 20.  | (17.) | 811,403    | 15 10½ |
| (3.)  | 10,959    | 16 | 0   | ÷ 24.  | (18.) | 14,308     | 0 0    |
| (4.)  | 35,162    | 11 | 0   | ÷ 36.  | (19.) | 1,063      | 2 6    |
| (5.)  | 16,658    | 11 | 0   | ÷ 54.  | (20.) | 453,558    | 10 6   |
| (6.)  | 36,325    | 12 | 0   | ÷ 48.  | (21.) | 10,680,538 | 15 0   |
| (7.)  | 194,419   | 18 | 0½  | ÷ 63.  | (22.) | 582,378    | 6 0    |
| (8.)  | 561,993   | 8  | 4   | ÷ 80.  | (23.) | 1,298,974  | 9 3    |
| (9.)  | 2,375,453 | 13 | 9½  | ÷ 27.  | (24.) | 7,278,723  | 14 0   |
| (10.) | 6,579,152 | 11 | 10½ | ÷ 110. | (25.) | 7,782,820  | 19 2½  |
| (11.) | 73,423    | 5  | 10½ | ÷ 81.  | (26.) | 336,114    | 6 8    |
| (12.) | 2,341     | 10 | 8½  | ÷ 49.  | (27.) | 101,423    | 12 10½ |
| (13.) | 365,319   | 7  | 1   | ÷ 28.  | (28.) | 422,884    | 9 4    |
| (14.) | 108,863   | 14 | 8   | ÷ 32.  | (29.) | 9,726,954  | 12 9   |
| (15.) | 425,383   | 7  | 6   | ÷ 60.  | (30.) | 10,376,337 | 18 0   |

These exercises should also be worked by Long Division.

**Example 3.** When the divisor exceeds 12, and cannot be resolved into factors.

| <u>£</u>     | <u>s.</u> | <u>d.</u>        |              |
|--------------|-----------|------------------|--------------|
| 434          | 5         | 11 $\frac{1}{4}$ |              |
|              |           |                  | $\div 935$   |
| 935 ) 406067 | 11        | 6 $\frac{3}{4}$  |              |
| 3740++       |           |                  |              |
|              |           |                  | <u>3206</u>  |
|              |           |                  | <u>2805</u>  |
|              |           |                  | <u>4017</u>  |
|              |           |                  | <u>3740</u>  |
|              |           |                  | <u>277</u>   |
|              |           |                  | <u>20</u>    |
|              |           |                  | <u>5551</u>  |
|              |           |                  | <u>4675</u>  |
|              |           |                  | <u>876</u>   |
|              |           |                  | <u>12</u>    |
|              |           |                  | <u>10518</u> |
|              |           |                  | <u>935+</u>  |
|              |           |                  | <u>1168</u>  |
|              |           |                  | <u>935</u>   |
|              |           |                  | <u>233</u>   |
|              |           |                  | <u>4</u>     |
|              |           |                  | <u>935</u>   |
|              |           |                  | <u>935</u>   |
|              |           |                  | <u>0</u>     |

## Exercise 31.

|       | <i>£</i> | <i>s.</i> | <i>d.</i>       |            | <i>£</i> | <i>s.</i> | <i>d.</i>          |             |
|-------|----------|-----------|-----------------|------------|----------|-----------|--------------------|-------------|
| (1.)  | 1,247    | 0         | 0               | $\div 86.$ | (42.)    | 4,433     | 4 $10\frac{1}{2}$  | $\div 78.$  |
| (2.)  | 2,638    | 19        | 0               | $\div 73.$ | (43.)    | 4,663     | 12 $2\frac{1}{2}$  | $\div 57.$  |
| (3.)  | 2,117    | 11        | 0               | $\div 57.$ | (44.)    | 2,247     | 14 $6\frac{1}{2}$  | $\div 47.$  |
| (4.)  | 6,439    | 3         | 0               | $\div 89.$ | (45.)    | 2,286     | 2 $2\frac{1}{2}$   | $\div 47.$  |
| (5.)  | 2,563    | 17        | 0               | $\div 47.$ | (46.)    | 5,319     | 7 $10\frac{1}{2}$  | $\div 99.$  |
| (6.)  | 2,164    | 9         | 0               | $\div 73.$ | (47.)    | 3,707     | 15 $4\frac{1}{2}$  | $\div 98.$  |
| (7.)  | 2,194    | 16        | 0               | $\div 59.$ | (48.)    | 6,283     | 7 $2\frac{1}{2}$   | $\div 85.$  |
| (8.)  | 3,861    | 0         | 0               | $\div 78.$ | (49.)    | 1,849     | 14 $7\frac{1}{2}$  | $\div 38.$  |
| (9.)  | 5,847    | 15        | 0               | $\div 69.$ | (50.)    | 6,370     | 6 $1\frac{1}{2}$   | $\div 76.$  |
| (10.) | 1,801    | 4         | 0               | $\div 38.$ | (51.)    | 456       | 0 $11\frac{1}{2}$  | $\div 23.$  |
| (11.) | 2,277    | 8         | 0               | $\div 59.$ | (52.)    | 4,947     | 1 $3\frac{1}{2}$   | $\div 57.$  |
| (12.) | 8,068    | 8         | 0               | $\div 92.$ | (53.)    | 8,144     | 11 $4\frac{1}{2}$  | $\div 95.$  |
| (13.) | 1,638    | 3         | 0               | $\div 67.$ | (54.)    | 5,642     | 9 $9\frac{1}{2}$   | $\div 59.$  |
| (14.) | 6,153    | 18        | 0               | $\div 73.$ | (55.)    | 3,472     | 13 $10\frac{1}{2}$ | $\div 67.$  |
| (15.) | 1,917    | 10        | 0               | $\div 59.$ | (56.)    | 4,297     | 6 $10\frac{1}{4}$  | $\div 73.$  |
| (16.) | 5,448    | 6         | 0               | $\div 78.$ | (57.)    | 1,505     | 10 $6\frac{1}{2}$  | $\div 56.$  |
| (17.) | 2,739    | 5         | $2\frac{1}{4}$  | $\div 59.$ | (58.)    | 1,076     | 16 $6\frac{1}{2}$  | $\div 17.$  |
| (18.) | 3,528    | 4         | 5               | $\div 76.$ | (59.)    | 17        | 17 $7\frac{1}{2}$  | $\div 94.$  |
| (19.) | 6,921    | 4         | $11\frac{1}{2}$ | $\div 83.$ | (60.)    | 49        | 0 $10\frac{1}{2}$  | $\div 59.$  |
| (20.) | 3,606    | 9         | $8\frac{1}{2}$  | $\div 65.$ | (61.)    | 395,146   | 19 $7\frac{1}{2}$  | $\div 531.$ |
| (21.) | 1,085    | 1         | $11\frac{1}{2}$ | $\div 79.$ | (62.)    | 481       | 8 $4\frac{1}{2}$   | $\div 487.$ |
| (22.) | 249      | 14        | $4\frac{1}{2}$  | $\div 59.$ | (63.)    | 39,133    | 7 $0\frac{1}{2}$   | $\div 456.$ |
| (23.) | 26,699   | 1         | $2\frac{1}{2}$  | $\div 47.$ | (64.)    | 116,771   | 9 $8\frac{1}{2}$   | $\div 365.$ |
| (24.) | 5,738    | 17        | $10\frac{1}{2}$ | $\div 61.$ | (65.)    | 209       | 11 $3\frac{1}{2}$  | $\div 210.$ |
| (25.) | 4,844    | 5         | $9\frac{1}{2}$  | $\div 89.$ | (66.)    | 345,879   | 0 $2\frac{1}{2}$   | $\div 859.$ |
| (26.) | 5,943    | 14        | $4\frac{1}{2}$  | $\div 82.$ | (67.)    | 21,786    | 14 $7\frac{1}{2}$  | $\div 396.$ |
| (27.) | 7,700    | 10        | $11\frac{1}{2}$ | $\div 76.$ | (68.)    | 60        | 0 $0\frac{1}{2}$   | $\div 360.$ |
| (28.) | 87,649   | 3         | $5\frac{1}{2}$  | $\div 87.$ | (69.)    | 80,451    | 10 $3\frac{1}{2}$  | $\div 117.$ |
| (29.) | 4,004    | 18        | $9\frac{1}{2}$  | $\div 95.$ | (70.)    | 106,017   | 3 $4\frac{1}{2}$   | $\div 208.$ |
| (30.) | 3,635    | 15        | $4\frac{1}{2}$  | $\div 57.$ | (71.)    | 56,901    | 6 $9\frac{1}{2}$   | $\div 714.$ |
| (31.) | 4,059    | 19        | $8\frac{1}{2}$  | $\div 77.$ | (72.)    | 99        | 18 $9\frac{1}{2}$  | $\div 125.$ |
| (32.) | 41       | 9         | $4\frac{1}{2}$  | $\div 47.$ | (73.)    | 63,457    | 13 $9\frac{1}{2}$  | $\div 391.$ |
| (33.) | 4,317    | 18        | $4\frac{1}{2}$  | $\div 87.$ | (74.)    | 2,922,280 | 12 $6\frac{1}{2}$  | $\div 597.$ |
| (34.) | 3,749    | 12        | $4\frac{1}{2}$  | $\div 65.$ | (75.)    | 284       | 18 $8\frac{1}{2}$  | $\div 307.$ |
| (35.) | 7,363    | 16        | $3\frac{1}{2}$  | $\div 97.$ | (76.)    | 193,368   | 11 $4\frac{1}{2}$  | $\div 509.$ |
| (36.) | 7,706    | 15        | $10\frac{1}{2}$ | $\div 93.$ | (77.)    | 526,395   | 11 $5\frac{1}{2}$  | $\div 650.$ |
| (37.) | 1,448    | 15        | $4\frac{1}{2}$  | $\div 78.$ | (78.)    | 907       | 12 $7\frac{1}{2}$  | $\div 909.$ |
| (38.) | 2,230    | 10        | $9\frac{1}{2}$  | $\div 83.$ | (79.)    | 10,011    | 14 $11\frac{1}{2}$ | $\div 906.$ |
| (39.) | 4,348    | 3         | 7               | $\div 68.$ | (80.)    | 2,763     | 19 $11\frac{1}{2}$ | $\div 195.$ |
| (40.) | 1,745    | 10        | $6\frac{1}{2}$  | $\div 19.$ | (81.)    | 3,725     | 17 $6\frac{1}{2}$  | $\div 481.$ |
| (41.) | 1,285    | 16        | $5\frac{1}{2}$  | $\div 39.$ | (82.)    | 44,154    | 9 $9\frac{1}{2}$   | $\div 102.$ |

| £                  | s. | d.                       | £            | s. | d.                     |
|--------------------|----|--------------------------|--------------|----|------------------------|
| (ss.) 93,826       | 14 | 9 $\frac{1}{4}$ ÷ 285.   | (87.) 29,047 | 19 | 8 $\frac{1}{4}$ ÷ 219. |
| (84.) 91,016       | 9  | 5 $\frac{1}{2}$ ÷ 663.   | (88.) 36,275 | 15 | 6 $\frac{1}{2}$ ÷ 295. |
| (85.) 39,268       | 4  | 11 $\frac{1}{2}$ ÷ 297.  | (89.) 76,338 | 16 | 5 $\frac{1}{2}$ ÷ 927. |
| (86.) 65,548       | 16 | 7 $\frac{1}{2}$ ÷ 940.   | (90.) 54,998 | 8  | 7 $\frac{1}{2}$ ÷ 392. |
| <b>£</b>           |    |                          |              |    |                        |
| (91.) 7,009,490    | 8  | 11 $\frac{1}{2}$ ÷ 4560. |              |    |                        |
| (92.) 39,800,004   | 0  | 10 $\frac{1}{2}$ ÷ 9047. |              |    |                        |
| (93.) 908,763,487  | 11 | 0 $\frac{1}{2}$ ÷ 3960.  |              |    |                        |
| (94.) 9,007,649    | 9  | 7 $\frac{1}{2}$ ÷ 9086.  |              |    |                        |
| (95.) 45,008,600   | 0  | 11 $\frac{1}{2}$ ÷ 8007. |              |    |                        |
| (96.) 709,000,867  | 18 | 0 $\frac{1}{2}$ ÷ 4970.  |              |    |                        |
| (97.) 7,009,490    | 8  | 3 $\frac{1}{2}$ ÷ 9009.  |              |    |                        |
| (98.) 55,706,904   | 0  | 9 $\frac{1}{2}$ ÷ 3539.  |              |    |                        |
| (99.) 970,607,409  | 18 | 0 $\frac{1}{2}$ ÷ 3905.  |              |    |                        |
| (100.) 908,763,487 | 11 | 0 $\frac{1}{2}$ ÷ 1980.  |              |    |                        |

- (101.) If I earn £41. 3s. 4d. in a year, how much is that per week?
- (102.) A man spends £1886. 6s. 9 $\frac{1}{2}$ d. in repairing 39 houses: how much is that for each?
- (103.) A farmer sold 34 lambs for £62. 18s.: what was the price of each?
- (104.) I divide £2. 2s. equally among 16 boys: how much does each get?
- (105.) If a week's expenses amount to £96. 1s. 7 $\frac{1}{2}$ d., what is that per day?
- (106.) In a year I save £14. 19s.: what do I save per week?
- (107.) If 6 dozen bottles cost £12, how much is that for a bottle?
- (108.) Divide £97. 17s. 3 $\frac{1}{2}$ d. equally among 99 persons.
- (109.) A man bought 207 sheep for £408. 7s. 10 $\frac{1}{2}$ d.: how much is that for each sheep?
- (110.) If 73 pecks of potatoes cost £6. 18s. 4 $\frac{1}{2}$ d., find the price of one peck.
- (111.) Find the 6th part of £56. 0s. 8d.?
- (112.) How much per day is £149 a week?
- (113.) Divide £38. 14s. 10 $\frac{1}{2}$ d. by 8.
- (114.) What is the 9th part of £45. 16s. 7 $\frac{1}{2}$ d.?
- (115.) Ten persons have to pay between them a bill of £64. 3s. 5d.: what is the share of each?
- (116.) Find the 11th part of £800.

- (117.) Twelve cows cost £148. 17s. 6d. : what is the price of one?
- (118.) Divide £1907. 6s. 10d. by 1000.
- (119.) Divide £102,354. 14s. 8½d. equally among 93 persons.
- (120.) If 37 horses cost £434,167. 8s. 8½d., what is the price of each horse?
- 

## REDUCTION.

REDUCTION is the operation of converting numbers of one denomination into others of the same kind without altering their value.

Reduction is of two kinds— Reduction Descending and Reduction Ascending.

Reduction Descending is the operation of bringing numbers from a higher to a lower denomination.

Reduction of this kind is performed by Multiplication.

Example. Reduce       $\frac{\text{£}}{904} \frac{\text{s.}}{18} \frac{\text{d.}}{5\frac{1}{2}}$  to farthings.

$$\begin{array}{r} 20 \\ \hline 18098 \end{array} \text{ shillings.}$$

$$\begin{array}{r} 12 \\ \hline 217181 \end{array} \text{ pence.}$$

$$\text{Ans. } \underline{\underline{868726}} \text{ farthings.}$$

## Exercise 32.

Reduce :

| $\text{£}$ | $s.$ | $d.$ |               | $\text{£}$ | $s.$ | $d.$ |               |
|------------|------|------|---------------|------------|------|------|---------------|
| (1.) 0     | 0    | 6½   | to farthings. | (12.) 16   | 16   | 0    | to shillings. |
| (2.) 0     | 5    | 8½   | "             | (13.) 5    | 8    | 6    | to pence.     |
| (3.) 0     | 0    | 4½   | "             | (14.) 7    | 9    | 3    | "             |
| (4.) 0     | 6    | 8½   | "             | (15.) 6    | 7    | 8    | "             |
| (5.) 0     | 0    | 8½   | "             | (16.) 19   | 19   | 0    | to shillings. |
| (6.) 0     | 6    | 7½   | "             | (17.) 6    | 7    | 8½   | to farthings. |
| (7.) 6     | 0    | 0    | to shillings. | (18.) 18   | 9    | 6½   | to halfpence. |
| (8.) 18    | 10   | 0    | "             | (19.) 8    | 5    | 7½   | to farthings. |
| (9.) 17    | 17   | 0    | "             | (20.) 17   | 8    | 5½   | to halfpence. |
| (10.) 7    | 0    | 0    | "             | (21.) 7    | 7    | 7½   | to farthings. |
| (11.) 15   | 10   | 0    | "             | (22.) 16   | 8    | 4½   | to halfpence. |

|       | £   | s. | d.               |               | £     | s.  | d. |                 |               |
|-------|-----|----|------------------|---------------|-------|-----|----|-----------------|---------------|
| (28.) | 3   | 18 | 9 $\frac{1}{2}$  | to farthings. | (30.) | 256 | 13 | 7               | to pence.     |
| (24.) | 0   | 17 | 10               | to pence.     | (31.) | 643 | 14 | 6               | "             |
| (25.) | 0   | 6  | 11 $\frac{1}{2}$ | to farthings. | (32.) | 0   | 7  | 9 $\frac{1}{2}$ | to farthing   |
| (26.) | 2   | 13 | 8                | to pence.     | (33.) | 17  | 15 | 4 $\frac{1}{2}$ | "             |
| (27.) | 17  | 4  | 3                | "             | (34.) | 39  | 16 | 0 $\frac{1}{2}$ | to halfpence  |
| (28.) | 68  | 16 | 10               | "             | (35.) | 5   | 10 | 0               | to threepence |
| (29.) | 156 | 17 | 8                | "             | (36.) | 18  | 5  | 9               | "             |

- (37.) 1482 florins to farthings.  
 (38.) 529 half-crowns to halfpence.  
 (39.) 459 half-guineas to halfpence.  
 (40.) 156 crowns to sixpences.  
 (41.) 746 half-sovereigns to halfpence.  
 (42.) £15. 16s. 6d. to sixpences.  
 (43.) 574 guineas to threepences.  
 (44.) £28. 16s. 5 $\frac{1}{2}$ d. to farthings.  
 (45.) £73. 14s. 8 $\frac{1}{2}$ d. to halfpence.  
 (46.) £7. 14s. to threepences.  
 (47.) £49. 17s. 6d. to threepences.  
 (48.) 849 guineas to threepences.  
 (49.) 341 florins to farthings.  
 (50.) 437 half-crowns to halfpence.  
 (51.) 528 half-guineas to halfpence.  
 (52.) 495 crowns to sixpences.  
 (53.) 524 half-sovereigns to halfpence.  
 (54.) £48. 17s. 6d. to sixpences.  
 (55.) £964. 18s. 5 $\frac{1}{2}$ d. to halfpence.  
 (56.) 693 guineas 14 shillings to farthings.  
 (57.) 4987 half-sovereigns to pence.  
 (58.) 59,875 crowns to fourpenny pieces.  
 (59.) 48,963 half-crowns to sixpences.  
 (60.) £8236. 17s. 4d. to fourpenny pieces.  
 (61.) 96,843 sixpences to farthings.  
 (62.) £9648. 18s. to florins.  
 (63.) 8793 guineas to threepences.  
 (64.) £4986. 17s. 6d. to sixpences.  
 (65.) £697. 17s. 3 $\frac{1}{2}$ d. to halfpence.  
 (66.) 743 guineas 15 shillings to farthings.  
 (67.) 6385 half-sovereigns to pence.  
 (68.) 53,976 crowns to fourpenny pieces.  
 (69.) 39,765 half-crowns to sixpences.  
 (70.) £9345. 18s. 8d. to fourpenny pieces.  
 (71.) 78,934 sixpences to farthings.  
 (72.) £6,498 14s. to florins.

- (73.) 9783 guineas to threepences.  
 (74.) £5679. 18s. 6d. to sixpences.  
 (75.) £674. 17s. 4½d. to halfpence.  
 (76.) 475 guineas 13 shillings to farthings.  
 (77.) 4967 half-sovereigns to pence.  
 (78.) 79,354 crowns to fourpenny pieces.  
 (79.) 94,863 half-crowns to sixpences.  
 (80.) £9236. 17s. 4d. to fourpenny pieces.  
 (81.) 79,843 sixpences to farthings.  
 (82.) £6948. 12s. to florins.  
 (83.) 9873 guineas to threepences.  
 (84.) £4589. 13s. 6d. to sixpences.  
 (85.) 4879 pounds to farthings.  
 (86.) 9638 guineas to halfpence.  
 (87.) 4638 half-sovereigns to farthings.  
 (88.) 5967 pounds to farthings.  
 (89.) 6376 half-sovereigns to farthings.  
 (90.) 4396 guineas to halfpence.  
 (91.) 5987 crowns to halfpence.  
 (92.) 5438 half-crowns to farthings.  
 (93.) 4987 florins to halfpence.  
 (94.) 4639 crowns to halfpence.  
 (95.) 5395 florins to halfpence.  
 (96.) 27 guineas 15s. 6½d. to halfpence.  
 (97.) 4837 crowns to halfpence.  
 (98.) 27 crowns to half-crowns.  
 (99.) 405 guineas to half-guineas.  
 (100.) 207 half-guineas to sixpences.

Reduction Ascending is the operation of bringing numbers from a lower to a higher denomination.

Reduction of this kind is performed by Division.

Example. Reduce 868,726 farthings to pounds.

$$\begin{array}{r}
 4 | 868,726 \\
 12 | 217,181 + \frac{1}{2}d. \\
 20 | 1,809(8 + 5d.) \\
 \text{Ans. } \underline{\underline{\text{£904. 18s. } 5\frac{1}{2}d.}}
 \end{array}$$

### Exercise 33.

Reduce :—

- |                               |                                  |                       |   |
|-------------------------------|----------------------------------|-----------------------|---|
| (1.) 678 shillings to pounds. | (4.) 64,769 farthings to pounds. |                       |   |
| (2.) 17,853 shillings         | "                                | (5.) 59,375 farthings | " |
| (3.) 6,894 pence              | "                                | (6.) 69,483 halfpence | " |

|       |   |            |                             |
|-------|---|------------|-----------------------------|
| (7.)  | 576 shillings to pounds.                    | (12.)      | 59,387 farthings to pounds. |
| (8.)  | 15,783 shillings                            | "          | 564 shillings "             |
| (9.)  | 4,689 pence                                 | "          | 19,875 shillings "          |
| (10.) | 64,873 farthings                            | "          | 9,486 pence "               |
| (11.) | 63,479 halfpence                            | "          | 54,879 farthings "          |
| (17.) | 69,736 farthings                            | to pounds. |                             |
| (18.) | 56,879 halfpence                            | "          |                             |
| (19.) | 59,873 shillings                            | "          |                             |
| (20.) | 67,854 florins                              | "          |                             |
| (21.) | 49,876 half-crowns                          | "          |                             |
| (22.) | 59,382 crowns                               | "          |                             |
| (23.) | 49,769 sixpences                            | "          |                             |
| (24.) | 59,387 fourpenny pieces                     | "          |                             |
| (25.) | 68,493 threepenny pieces                    | "          |                             |
| (26.) | 98,723 pence                                | "          |                             |
| (27.) | 59,865 halfpence                            | "          |                             |
| (28.) | 39,297 farthings                            | "          |                             |
| (29.) | 49,371 threepenny pieces                    | "          |                             |
| (30.) | 59,879 fourpenny pieces                     | "          |                             |
| (31.) | 49,873 fourpenny pieces to half-sovereigns. | "          |                             |
| (32.) | 78,347 halfpence to half-crowns.            | "          |                             |
| (33.) | 96,845 florins to guineas.                  | "          |                             |
| (34.) | 7,834 threepences to crowns.                | "          |                             |
| (35.) | 98,473 pence to half-crowns.                | "          |                             |
| (36.) | 96,843 half-crowns to half-sovereigns.      | "          |                             |
| (37.) | 9,874 halfpence to half-guineas.            | "          |                             |
| (38.) | 29,375 fourpenny pieces to half-sovereigns. | "          |                             |
| (39.) | 89,305 halfpence to half-crowns.            | "          |                             |
| (40.) | 73,497 florins to guineas.                  | "          |                             |
| (41.) | 4,698 threepences to crowns.                | "          |                             |
| (42.) | 64,793 pence to half-crowns.                | "          |                             |
| (43.) | 46,398 half-crowns to half-sovereigns.      | "          |                             |
| (44.) | 8,756 halfpence to half-guineas.            | "          |                             |
| (45.) | 59,375 fourpenny pieces to half-sovereigns. | "          |                             |
| (46.) | 69,489 florins to guineas.                  | "          |                             |
| (47.) | 4,876 threepences to crowns.                | "          |                             |
| (48.) | 46,987 pence to half-crowns.                | "          |                             |
| (49.) | 64,891 half-crowns to half-sovereigns.      | "          |                             |
| (50.) | 4,986 halfpence to half-guineas.            | "          |                             |
| (51.) | 3,146 farthings to shillings.               | "          |                             |
| (52.) | 5,249 sixpences to sovereigns.              | "          |                             |
| (53.) | 5,904 halfpence to shillings.               | "          |                             |
| (54.) | 9,132 threepences to florins.               | "          |                             |
| (55.) | 3,716 pence to guineas.                     | "          |                             |

- (56.) 2,504 pence to half-guineas.  
 (57.) 39,456 farthings to pounds.  
 (58.) 97,864 halfpence to half-sovereigns.  
 (59.) 78,239 threepences to half-guineas.  
 (60.) 29,456 halfpence to half-crowns.

## Exercise 34.

## MISCELLANEOUS EXERCISES.

Reduce :—

- (1.) 4,371 sixpences to sovereigns.  
 (2.) 6,874 threepences to florins.  
 (3.) 4,534 pence to guineas.  
 (4.) 1,760 pence to half-guineas.  
 (5.) 64,538 farthings to pounds.  
 (6.) 73,890 halfpence to half-sovereigns.  
 (7.) 87,064 threepences to half-guineas.  
 (8.) 46,729 halfpence to half-crowns.  
 (9.) 456 half-guineas to half-crowns.  
 (10.) 23,421 half-guineas to crowns.  
 (11.) 10 guineas to half-crowns.  
 (12.) 2,814 half-crowns to guineas.  
 (13.) 14,728 crowns to guineas.  
 (14.) 753 half-guineas to half-crowns.  
 (15.) 57,294 half-guineas to crowns.  
 (16.) 15 guineas to half-crowns.  
 (17.) 3,721 half-crowns to guineas.  
 (18.) 31,479 crowns to guineas.  
 (19.) 86,732 florins to £. s. d.  
 (20.) 59,733 half-crowns to £. s. d.  
 (21.) 84,736 crowns        "        "  
 (22.) 59,793 sixpences        "        "  
 (23.) 67,394 florins        "        "  
 (24.) 49,856 half-crowns        "        "  
 (25.) 68,943 crowns        "        "  
 (26.) 39,287 sixpences        "        "  
 (27.) 5,984 half-crowns to florins.  
 (28.) 67,983 pence to guineas.  
 (29.) 4,986 half-crowns to florins.  
 (30.) 37,986 pence to guineas.  
 (31.) 96,487 sixpences to fourpenny pieces.  
 (32.) 19,807 guineas to pounds.  
 (33.) 987 fourpenny pieces to farthings.  
 (34.) 678 half-guineas to pence.  
 (35.) 27½ guineas to farthings.

- (36.) 7,946 half-crowns to florins.  
 (37.) 96,387 pence to guineas.  
 (38.) 69,873 sixpences to fourpenny pieces.  
 (39.) 29,709 guineas to pounds.  
 (40.) 689 fourpenny pieces to farthings.  
 (41.) 574 half-guineas to pence.  
 (42.) 19½ guineas to farthings.  
 (43.) 58,397 half-pence to half-crowns.  
 (44.) 74,983 sixpences to fourpenny pieces.  
 (45.) 17,403 guineas to pounds.  
 (46.) 583 fourpenny pieces to farthings.  
 (47.) 796 half-guineas to pence.  
 (48.) 33½ guineas to farthings.  
 (49.) 681 crowns to £. s. d.  
 (50.) 500 pounds to crowns.
- (51.) How many sixpences should you get in exchange for £683 ?  
 (52.) Reduce 174,867 sixpences to pounds.  
 (53.) How many pounds, etc., are equivalent to 7158 halfpence ?  
 (54.) How many guineas are there in 10,796 farthings ?  
 (55.) How many pounds are there in 4171 halfpence ?  
 (56.) How many half-crowns in £681. 12s. 6d. ?  
 (57.) Add together £147. 17s. 6½d. and ten thousand and forty-seven farthings.  
 (58.) How many pounds are equal to 10,500 guineas ?  
 (59.) How many farthings in a pound ?  
 (60.) How often is 17s. 6d. contained in £1000 ?  
 (61.) How often could you subtract 1s. 4½d. from £4. 2s. 6d. ?  
 (62.) How many slates at 4½d. each can be bought for £17. 10s. 3d. ?  
 (63.) How many yards at 5s. 2d. a yard can be got for £103. 6s. 8d. ?  
 (64.) How many pounds at 1s. 2½d. a pound can be bought for £7. 18s. 3½d. ?  
 (65.) How many twopences are there in £155. 7s. ?  
 (66.) How many half-crown tickets could be bought for £15. 2s. 6d. ?  
 (67.) Reduce 7168 half-crowns to pence.  
 (68.) From a thousand shillings take 10,000 pence.  
 (69.) From 500 half-crowns take 500 half-pence.

- (1) A man has 5 sovereigns, 7 half-sovereigns, 3 half-crowns, 4 shillings, and 11 sixpences in his purse : how many pence are they all worth ?

**Example 1.**

$$\begin{array}{r}
 \text{Reduce } 8 \quad 17 \quad 0 \quad 24 \quad 15 \text{ to ozs.} \\
 \hline
 20 \\
 \overline{177} \text{ cwts.} \\
 4 \\
 \overline{708} \text{ qrs.} \\
 28 \\
 \overline{5688} \\
 1416 \\
 \overline{19848} \text{ lbs.} \\
 16 \\
 \overline{119103} \\
 19848 \\
 \overline{317583} \text{ ozs.}
 \end{array}$$

*Ans.* 317,583 ozs.

**Example 2.** Reduce 317,583 ozs. to tons.

$$\begin{array}{l}
 16 \left\{ \begin{array}{l} 4 \overline{317583} \\ 4 \overline{79395+3} \end{array} \right\} = 15 \text{ ozs.} \\
 28 \left\{ \begin{array}{l} 7 \overline{19848+3} \\ 4 \overline{2835+3} \\ 4 \overline{708+3} \end{array} \right\} = 24 \text{ lbs.} \\
 2 \overline{17(7-0) gr.} \\
 \hline 8 \quad 17 \quad 0 \quad 24 \quad 15
 \end{array}$$

*Ans.* 8 tons 17 cwts. 0 qrs. 24 lbs. 15 ozs.

### Exercise 35.

#### AVOIRDUPOIS WEIGHT.

Reduce :—

- |                        |                        |
|------------------------|------------------------|
| (1.) 79 tons to cwts.  | (5.) 36 lbs. to drams. |
| (2.) 468 cwts. to qrs. | (6.) 15 qrs. to ozs.   |
| (3.) 86 cwts. to lbs.  | (7.) 13 cwts. to ozs.  |
| (4.) 37 tons to qrs.   | (8.) 40 tons to qrs.   |

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| (9.) 18 tons to stones.               | (85.) 14 tons 14 cwts. to stones.     |
| (10.) 15 stones to ozs.               | (86.) 5967 stones to tons.            |
| (11.) 43 tons to lbs.                 | (87.) 64,879 lbs. to tons.            |
| (12.) 32 cwts. to drams.              | (88.) 968,473 ozs. to cwts.           |
| (13.) 24 stones to drams.             | (89.) 567,890 drs. to stones.         |
| (14.) 5 qrs. to drams.                | (90.) 967,483 ozs. to qrs.            |
| (15.) 13 ozs. 7 drams to drams.       | (41.) 13 ozs. 6 drs. to drs.          |
| (16.) 14 lbs. 3 ozs. to ozs.          | (42.) 11 lbs. 5 oza. to ozs.          |
| (17.) 9 lbs. 13 ozs. 7 drs. to drs.   | (43.) 13 lbs. 9 oz. 7 drs. to drs.    |
| (18.) 11 lbs. 9 drs. to drs.          | (44.) 14 lbs. 8 drs. to drs.          |
| (19.) 3 qrs. 15 lbs. 7 ozs. to ozs.   | (45.) 3 qrs. 12 lbs. 8 ozs. to ozs.   |
| (20.) 3 qrs. 9 ozs. to drs.           | (46.) 2 qrs. 9 ozs. to drs.           |
| (21.) 15 cwts. 2 qrs. 9 ozs. to ozs.  | (47.) 15 cwts. 3 qrs. 10 ozs. to ozs. |
| (22.) 19 cwts. 13 drs. to drs.        | (48.) 17 cwts. 12 drs. to drs.        |
| (23.) 3 tons 16 cwts. 2 qrs. to lbs.  | (49.) 7 tons 15 cwts. 2 qrs. to lbs.  |
| (24.) 15 tons 15 cwts. to stones.     | (50.) 6 tons 16 cwts. to stones.      |
| (25.) 647 cwts. to tons.              | (51.) 5879 qrs. to tons.              |
| (26.) 6935 qrs. to tons.              | (52.) 6973 stones to tons.            |
| (27.) 4968 stones to tons.            | (53.) 54,987 cwts. to tons.           |
| (28.) 74,869 lbs. to tons.            | (54.) 796,845 ozs. to cwts.           |
| (29.) 869,647 ozs. to cwts.           | (55.) 678,934 drs. to stones.         |
| (30.) 968,745 drs. to stones.         | (56.) 698,741 ozs. to qrs.            |
| (31.) 689,734 ozs. to qrs.            | (57.) 7 tons 7 stones to pounds.      |
| (32.) 14 cwts. 2 qrs. 11 ozs. to ozs. | (58.) 5 cwts. 13 ozs. to drs.         |
| (33.) 18 cwts. 14 drs. to drs.        | (59.) 1594 ozs. to qrs.               |
| (34.) 5 tons 13 cwts. 1 qr. to lbs.   | (60.) How many lbs. in 50 tons.       |

### Exercise 36.

#### TIME.

Reduce :—

- |                                |   |
|--------------------------------|---|
| (1.) 5 hours to seconds.       | (15.) 253,487 seconds to days.              |
| (2.) 17 days to minutes.       | (16.) 19 mos. 2 wks. 3 dys. to dys.         |
| (3.) 4 weeks to hours.         | (17.) 1 year 13 weeks to days.              |
| (4.) 15 months to days.        | (18.) 3 yrs. 3 dys. 4 hrs. to hrs.          |
| (5.) 12 years to weeks.        | (19.) 26 dys. 30 mins. to secs.             |
| (6.) 3 weeks to minutes.       | (20.) 7 mos. 3 dys. to minutes.             |
| (7.) 2 years to minutes.       | (21.) 23 dys. 45 mins. to secs.             |
| (8.) 16 weeks to seconds.      | (22.) 9 mos. 2 wks. 4 dys. to dys.          |
| (9.) 245 days to seconds.      | (23.) 3 years 24 weeks to days.             |
| (10.) 42 months to hours.      | (24.) 2 yrs. 6 dys. 7 hrs. to hrs.          |
| (11.) 52,843 seconds to hours. | (25.) 47 dys. 15 min. to secs.              |
| (12.) 74,396 minutes to days.  | (26.) 9 mos. 5 dys. to minutes.             |
| (13.) 38,946 hours to weeks.   | ( <sup>or</sup> ) 47 dys. 23 mins. to secs. |
| (14.) 135,704 days to years.   | 280 secs. to mos.                           |

- |                               |                                  |
|-------------------------------|----------------------------------|
| (1.) 200,040 seconds to days. | (35.) 5,296,432 secs. to months. |
| (2.) 764,243 mins. to weeks.  | (36.) 1,000,002 secs. to days.   |
| (3.) 617,015 secs. to weeks.  | (37.) 100,001 mins. to weeks.    |
| (4.) 257,493 hours to years.  | (38.) 4,317,540 secs. to weeks.  |
| (5.) 543,078 mins. to months. | (39.) 483,729 hours to years.    |
| (6.) 329,468 seconds to days. | (40.) 290,384 min. to months.    |

**Exercise 37.****TROY WEIGHT.**

Reduce :—

- |   |                              |
|---|------------------------------|
| (1.) 507 lbs. to ozs.                           | (15.) 79,381 grs. to dwts.   |
| (2.) 65 lbs. to dwts.                           | (16.) 467,203 grs. to lbs.   |
| (3.) 17 lbs. to grains.                         | (17.) 79,415 dwts. to lbs.   |
| (4.) 12 lbs. 3 oz. to dwts.                     | (18.) 586,341 grs. to ozs.   |
| (5.) 10 ozs. 16 dwts. to grains.                | (19.) 924,016 grs. to dwts.  |
| (6.) 8 lbs. 10 ozs. 13 dwts. 2 grs. to grains.  | (20.) 7,386,419 grs. to lbs. |
| (7.) 9 lbs. 11 ozs. 14 dwts. 16 grs. to grains. |                              |
| (8.) 464 lbs. 12 dwts. to dwts.                 |                              |
| (9.) 8 ozs. 21 grs. to grains.                  |                              |
| (10.) 3,690 ozs. to lbs.                        |                              |
| (11.) 71,151 dwts. to lbs.                      |                              |
| (12.) 84,162 grs. to ozs.                       |                              |
| (13.) 7,710 dwts. to lbs.                       |                              |
| (14.) 79,638,417 grs. to lbs.                   |                              |

**Exercise 38.****LONG MEASURE.**

Reduce :—

- (1.) 2 feet 8 inches to inches.
- (2.) 3 yards 2 feet 7 inches to inches.
- (3.) 5 yards 1 foot 6 inches to inches.
- (4.) 380 yards to inches.
- (5.) 51,726 inches to yards.
- (6.) 351,264 inches to yards.
- (7.) 3 miles to perches.
- (8.) 1 mile 2 furlongs 5 perches to perches.
- (9.) 76,294 perches to miles.
- (10.) 574,029 perches to miles.
- (11.) 27 miles 3 furlongs to perches.
- (12.) 2 leagues to perches.
- (13.) 1 mile to inches.
- (14.) 2 miles 16 perches to inches.
- (15.) 1 league to inches.
- (16.) 372,695 inches to miles.

- (17.) 3 furlongs 6 perches 4 yards to yards.
- (18.) 16 perches 2 yards to inches.
- (19.) 5 furlongs 3 yards to feet.
- (20.) 5,296,734 inches to miles.
- (21.) 18 Irish miles to yards.
- (22.) 4 furlongs 35 perches (Irish) to feet.
- (23.) 7 miles 3 furlongs (Irish) to inches.
- (24.) 79 perches (Irish) to inches.
- (25.) 231,278 yards to miles.
- (26.) 1,768,403 inches to Irish miles.
- (27.) 368,927 feet to furlongs.
- (28.) 368,294 yards to leagues.
- (29.) 1,000,000 inches to miles.
- (30.) 491 yards to furlongs (Irish).

### Exercise 39.

#### SQUARE MEASURE.

Reduce :—

- (1.) 16 sq. yards 4 sq. feet 126 sq. inches to sq. inches.
- (2.) 17 sq. yards 5 sq. feet 96 sq. inches to sq. inches.
- (3.) 14 sq. yards 5 sq. feet 106 sq. inches to sq. inches.
- (4.) 607 acres to sq. perches.
- (5.) 59 acres 3 roods to sq. perches.
- (6.) 5 acres to sq. yards.
- (7.) 1 rood 8 sq. yards to sq. feet.
- (8.) 2 acres 16 perches to sq. feet.
- (9.) 9 acres 3 roods 17 sq. perches to sq. yards (Irish).
- (10.) 2 roods to sq. feet.
- (11.) 3 roods 4 perches 23 sq. yards 108 sq. in. to sq. in.
- (12.) 32 sq. perches 15 sq. yards to sq. inches.
- (13.) 1425 sq. perches to acres.
- (14.) 69,075 sq. inches to sq. yards.
- (15.) 3560 roods to acres.
- (16.) 27 acres 15 sq. perches to sq. perches.
- (17.) 59,682 sq. inches to sq. yards.
- (18.) 6279 sq. inches to sq. yards.
- (19.) 1 acre to sq. inches.
- (20.) 10,000,000 sq. inches to acres.

### Exercise 40.

#### CLOTH MEASURE.

Reduce :—

- (1.) 27 yards to nails.
- (2.) 54 yards 2 quarters 3 nails to nails.

- (3.) 17 yards 2 nails to nails.
- (4.) 5976 yards to nails.
- (5.) 368,279 nails to yards.
- (6.) 576,829 nails to English ells.
- (7.) 27 English ells 2 quarters 1 nail to nails.
- (8.) 3684 yards to English ells.
- (9.) 2794 English ells to yards.
- (10.) 396,273 nails to Flemish ells.

**Exercise 41.****CAPACITY.**

Reduce :—

- (1.) 674 quarts to noggins.
- (2.) 586 gallons to pints.
- (3.) 74 gallons 3 quarts to noggins.
- (4.) 419 gills to gallons.
- (5.) 75 gallons 1 pint to gills.
- (6.) 380 quarters 7 bushels to pecks.
- (7.) 6171 gills to gallons.
- (8.) 4997 pecks to quarters.
- (9.) 3 gallons 1 pint to noggins.
- (10.) 4006 pecks to quarters.
- (11.) 56 bushels 2 pecks 3 quarts to quarts.
- (12.) 8256 pints to bushels.
- (13.) 1597 quarts to bushels.
- (14.) 4 bushels 3 pecks 6 quarts to pints.
- (15.) 5 bushels 2 pecks 1 gallon 1 pint to pints.
- (16.) 8 gallons 3 quarts 1 pint to gills.
- (17.) 15,040 gills to loads, etc.
- (18.) 15 loads 3 quarters 7 bushels 3 pecks to quarts.
- (19.) 7,015,020 pints to bushels.
- (20.) 3,507,510 quarts to quarters.

**MISCELLANEOUS EXERCISES ON  
THE COMPOUND RULES AND REDUCTION.****Exercise 42.**

- (1.) Reduce 29 days 12 hours 44 minutes 3 seconds to seconds.
- (2.) Reduce 43,970 ounces to tons.
- (3.) Reduce 704,520 drams to cwts.
- (4.) Reduce 18 quarters 7 bushels 3 pecks to pints.
- (5.) Reduce 9 tons 5 cwts. to pounds.

- (6.) Reduce 91,309 minutes to weeks.
- (7.) Reduce 4,080,905 seconds to weeks.
- (8.) How many cwt. etc. are there in 108,234 ounces ?
- (9.) Reduce 1 ton 16 cwt. 3 quarters 5 pounds to ounces.
- (10.) Reduce 500,627 seconds to days.
  
- (11.) Reduce 1,008,581 seconds to days.
- (12.) Reduce 9,752,078 drams to tons.
- (13.) In £46. 5s. 11 $\frac{3}{4}$ d. how many farthings ?
- (14.) Reduce 11,880 pence to pounds.
- (15.) In 41 weeks how many seconds ?
  
- (16.) How many grains are there in 5 ozs. 14 dwts. 14 grains ?
- (17.) Reduce 7,311 inches to yards.
- (18.) Reduce 4 years 7 months to hours.
- (19.) Reduce 17 cwt. 3 qrs. 18 lbs. to lbs.
- (20.) Reduce 7 stones 7 lbs. to ounces.
  
- (21.) Reduce £84. 10s. to fourpenny pieces.
- (22.) Reduce 3 miles 6 furlongs to yards.
- (23.) How often is 5 shillings contained in £100 ?
- (24.) How many yards of cambric at 3d. a yard can be bought for 15 guineas ?
- (25.) Find the price of 1 lb. of prunes at £5. 14s. 4d. for 112 lbs. ?
  
- (26.) If 112 lbs. of sugar cost 65s. 4d., what is the price of 1 lb. ?
- (27.) I paid £4. 15s. 4d. for a piece of calico at 8d. a yard : how many yards did it contain ?
- (28.) A labourer has 28s. 6d. a week : how much is that for a year ?
- (29.) Find the cost of a ton at 2s. 2 $\frac{1}{4}$ d. a cwt. ?
- (30.) How many yards of cloth at 1s. 5 $\frac{1}{2}$ d. a yard may be bought for £56 ?
  
- (31.) How often is 5d. contained in 111 guineas ?
- (32.) Reduce £100 to crowns.
- (33.) Find value in £ s. d. of 8000 crowns.
- (34.) Subtract 1 $\frac{1}{2}$ d. from £50.
- (35.) Reduce 215 yards 1 quarter 1 nail to nails.
  
- (36.) £3. 5s. 2 $\frac{1}{2}$ d.  $\times$  66.
- (37.) From £3962 take 15s. 2 $\frac{3}{4}$ d.

- 8.) A man saves  $3\frac{1}{2}d.$  a day : how much is that in 365 days ?  
 9.) Reduce £305. 15s. to crowns.  
 10.) A person has 5s. and buys  $1\frac{1}{2}$  articles at 2s. 6d. each : how much change does he get ?
- 11.) If 73 pecks of potatoes cost £6. 18s.  $4\frac{3}{4}d.$ , find the price of 1 peck ?  
 12.) The cost of 540 pairs of gloves is £53. 8s. 9d. : find the price of 1 pair ?  
 13.) How often is £4. 11s. 9d. contained in £55. 1s. ?  
 14.) A man gave £10 to pay for lodgings for the month of May at 3s. 6d. per day : how much change should he get ?  
 15.) Find the price of 25 score of sheep at £5. 12s. 6d. per score ?
- 16.) Bought 120 lbs. of tea for £24 : how much is that for 1 lb. ?  
 17.) If a stone of butter cost 11s. 8d., what will 8 stones cost ?  
 18.) If 69 bottles of wine cost £10. 12s. 9d., how much will a single bottle cost ?  
 19.) If 20 cwt. of pig-iron cost £8. 15s., how much is that per cwt. ?  
 20.) If £156. 13s. 4d. be divided equally among 20 men, what will each receive ?
- 21.) When 16 ounces of tea cost 3s. 4d., what should 1 ounce cost ?  
 22.) Potatoes are charged at the rate of 3s. 8d. for 8 stones : find the cost of 1 stone ?  
 23.) I gave my foreman £30 to pay 15 men a fortnight's wages at 19s. per week : how much should he return to me ?  
 24.) A man owes me £256, and can only pay me 13s. 6d. in every pound : how much shall I receive ?  
 25.) What will 96 pairs of gloves cost at 2s. 5d. per pair.
- 26.) What is the 48th part of £100 ?  
 27.) What will a soldier's pension amount to at 1s. 8d. a day for 92 days ?  
 28.) How often is 2s. 2d. contained in £4. 11s. ?  
 29.) If I owe an account of £7. 10s. 6d. to John Jones, and he owes me £2. 13s. 9d. : how much do I still owe him ?  
 30.) Find the price of 500 sheep at £5. 12s. 6d. each ?

- (61.) Find the price of 112 lbs. of sugar at 4*½*d. per lb. ?  
 (62.) Find the price of 8 stones of butter at 11s. 8d. per stc  
 (63.) A man paid a bill of £6. 17s. 6d. with 55 similar co  
     what coin was it ?  
 (64.) Divide £13 equally among 16 persons.  
 (65.) Take one hundred and one from one hundred thousa  
  
 (66.) A man has 5 half-crowns, 5 shillings, and 5 sixpen  
     how much is that in £ s. d.  
 (67.) Take 5*½*d. from £1000 ?  
 (68.) £718. 10s. to crowns.  
 (69.) 504 farthings to threepences.  
 (70.) 5687 minutes to seconds.
- 

### EXAMINATION EXERCISES FOR FOURTH CLASS.

#### SET I.

##### A1.

- (1.) Take £59. 16s. 11*½*d. from £1000.  
 (2.) A man saves 9*½*d. a day ; how much does he save i  
     year ?  
 (3.) Reduce £59. 15s. to crowns.  
 (4.) How many farthings in £532. 13s. 9*½*d. ?  
 (5.) Reduce 369,255 lbs. to tons.  
 (6.) Add together £75. 19s. 8*½*d., 17s. 6*½*d., £860, £2078.  
     8d., £45. 13s. 6*½*d., £9. 19s. 9*½*d., £55. 15s. 7*½*d.

##### B1.

- (1.) £597. 13s. 8*½*d. ÷ 67.  
 (2.) From £5001. 2s. 11*½*d. take £89. 17s. 11*½*d.  
 (3.) Multiply 8900 by 7060.  
 (4.) Reduce 240 yards 2 quarters 3 nails to nails.  
 (5.) Add together £29. 17s. 8*½*d., £95. 19s. 8*½*d., £68. 12s.  
     £239. 13s. 7*½*d., £560. 15s. 9d., 18s. 9*½*d., £6089. 7s.  
 (6.) Reduce 7,654,321 seconds to days.

##### C1.

- (1.) Multiply £10. 15s. 9*½*d. by 68.  
 (2.) Reduce £715. 10s. to crowns.  
 (3.)  $596,807 \div 79$ .

- (4.) From £25. 13s. 8 $\frac{1}{4}$ d. take £19. 19s. 9 $\frac{3}{4}$ d.  
 (5.) Subtract 8909 from 100,000.  
 (6.) £152. 19s. 8 $\frac{1}{2}$ d.  $\div$  95.

## D1.

- (1.) Divide £50 by 17.  
 (2.) Reduce 59,682 halfpence to pounds.  
 (3.) Multiply £17. 18s. 9 $\frac{3}{4}$ d. by 95.  
 (4.) £137. 19s. 8d.  $\div$  59.  
 (5.) From £17. 18s. 9 $\frac{1}{2}$ d. take £12. 19s. 9 $\frac{3}{4}$ d.  
 (6.) Reduce £397. 15s. to crowns.

## E1.

- (1.) Reduce 15 cwts. 2 qrs. 17 lbs. to ounces.  
 (2.) 59,708  $\div$  56.  
 (3.) Reduce 39,087 pence to pounds.  
 (4.) Reduce 3760 guineas to threepences.  
 (5.) From £500 take £54. 19s. 7 $\frac{1}{2}$ d.  
 (6.) Reduce 2 miles 1 furlong 4 perches 2 yards to yards.

## F1.

- (1.) A man has 5 sovereigns, 8 half-crowns, and 7 sixpences ;  
     how many pence is he worth ?  
 (2.) 901,010  $\div$  98.  
 (3.) Reduce 15 cwts. 3 qrs. 7 lbs. to lbs.  
 (4.) Reduce 5967 minutes to seconds.  
 (5.) From £59. 18s. 3 $\frac{1}{2}$ d. take £9. 19s. 9 $\frac{3}{4}$ d.  
 (6.) How many lbs. in 15 tons ?

## G1.

- (1.) Reduce £15. 17s. 6d. to half-crowns.  
 (2.) 973,608  $\div$  84.  
 (3.) Reduce 12 miles 2 furlongs 4 perches to yards.  
 (4.) A man saves 7s. 6 $\frac{1}{2}$ d. per day ; how much will he save  
     in 95 days ?  
 (5.) Reduce 4 weeks 3 days 2 hours to seconds.  
 (6.) From £97 take £90. 19s. 9 $\frac{1}{2}$ d.

## H1.

- (1.) Reduce 2 ozs. 17 dwts. to grains.  
 (2.) £49. 17s. 8 $\frac{1}{2}$ d.  $\div$  87.  
 (3.) Reduce 39,607 pence to pounds.  
 (4.) Take £29. 13s. 7 $\frac{1}{2}$ d. from £500.

- (a.) Divide 2000 by 79.  
 (b.)  $17\frac{1}{2}d. \times 397$ .

## I1.

- (1.) Reduce 24 miles 2 furlongs 18 perches to yards.  
 (2.) Take 8008 from 100,010.  
 (3.) £97. 8s.  $11\frac{1}{2}d.$   $\times 97$ .  
 (4.) Reduce 73,968 perches to acres.  
 (5.) £736. 13s.  $9\frac{1}{2}d.$   $\div 279$ .  
 (6.) From £95. 0s.  $7\frac{1}{2}d.$  take £39. 13s.  $8\frac{1}{2}d.$

## K1.

- (1.) From £5000. 2s.  $7\frac{1}{2}d.$  take £890. 19s. 9d.  
 (2.) Reduce 17 miles 5 furlongs 18 perches 2 yards to yards.  
 (3.) Take 98,109 from 1,000,100.  
 (4.) £10. 13s. 7d.  $\div 954$ .  
 (5.) Take £15. 19s.  $7\frac{1}{2}d.$  from £20.  
 (6.) Reduce 83,967 pence to half-crowns.

## L1.

- (1.) Reduce 36 tons to lbs.  
 (2.) Reduce 59,682 minutes to seconds.  
 (3.) How many threepences in £6729?  
 (4.) £5. 19s.  $7\frac{1}{2}d.$   $\times 120$ .  
 (5.) From £800 take £83. 18s.  $8\frac{1}{2}d.$   
 (6.) Reduce 39,682 pence to pounds.

## M1.

- (1.) Take 1s. 11d. from £100.  
 (2.) Reduce 800,000 farthings to threepences.  
 (3.) Add together £39. 17s.  $8\frac{1}{2}d.$ , £57. 12s.  $9\frac{1}{2}d.$ , 17s.  $6\frac{1}{2}d.$ ,  
     £95. 17s. 3d., £860. 13s.  $9\frac{1}{2}d.$ , £9. 19s.  $8\frac{1}{2}d.$ , and 11s.  $6\frac{1}{2}d.$   
 (4.) £1. 17s.  $8\frac{1}{2}d.$   $\times 98$ .  
 (5.) £968. 17s. 9d.  $\div 62$ .  
 (6.) Reduce 98,674 crowns to pounds.

## N1.

- (1.) Subtract £395. 5s. 9d. from £1000. 11s. 4d.  
 (2.) Reduce 5 cwts. to ounces.  
 (3.) Reduce £517. 13s.  $9\frac{1}{2}d.$  to farthings.  
 (4.) 8s.  $9\frac{1}{2}d.$   $\times 990$ .  
 (5.) Reduce 36,972 lbs. to cwts.  
 (6.)  $96,827 \div 56$ .

## O1.

- (1) Reduce 83,960 pence to crowns.  
 (2) £95. 17s. 8½d. ÷ 127.  
 (3) 7600 × 9080.  
 (4) 5968 lbs. to cwts.  
 (5) Take 8½d. from £1000.  
 (6) Reduce 5 tons 19 cwts. 3 qrs. 9 lbs. to lbs.

## P1.

- (1) £19. 19s. 8½d. × 68.  
 (2) Subtract £59. 18s. 7½d. from £608. 2s. 11d.  
 (3) A man spends 8½d. a day : how much is that in a year ?  
 (4) £93. 13s. 7½d. × 927.  
 (5) Reduce 93,672 lbs. to tons.  
 (6) Reduce £951. 15s. to crowns.

## Q1.

- (1) Reduce 3960 fourpences to threepences.  
 (2) 90,807 × 8096.  
 (3) Reduce £18. 17s. 9½d. to farthings.  
 (4) How many threepences in £95 ?  
 (5) Reduce 39,607 dwts. to lbs.  
 (6) 90,876 ÷ 84.

## R1.

- (1) Take £2. 19s. 11½d. from £50.  
 (2) Reduce £700 to fourpences.  
 (3) Reduce 96,823 lbs. to tons.  
 (4) Multiply 8070 by 7080.  
 (5) 93,627 ÷ 257.  
 (6) Reduce 3 lbs. 10 ozs. 17 dwts. to grains.

## S1.

- (1) Reduce 908,670 pence to crowns.  
 (2) £95. 13s. 7½d. ÷ 163.  
 (3) Reduce 9087 lbs. to cwts.  
 (4) Take 8½d. from £90.  
 (5) Reduce 3 tons 18 cwts. 2 qrs. to lbs.  
 (6) Multiply 9½d. by 365.

## T1.

- (1) Reduce 9 days 13 hours 12 minutes to seconds.  
 (2) 98,674 ÷ 36.

- (3.) Reduce £9. 7s. 6d. to fourpences.
- (4.) Reduce 900,000 farthings to threepences.
- (5.) Take 8s. 11 $\frac{1}{2}$ d. from £1.
- (6.) A person saves 11 $\frac{2}{3}$ d. a day, how much is that in a year?

## W1.

- (1.) Reduce 8972 farthings to shillings.
- (2.) Reduce 80 tons to lbs.
- (3.) In 9670 hours how many minutes?
- (4.) £1. 19s. 8 $\frac{1}{2}$ d.  $\times$  175.
- (5.) Take £7. 11s. 8 $\frac{1}{2}$ d. from £100.
- (6.) A person has 5 crowns, 8 half-crowns, 9 florins, and 30 sixpences: what is he worth in £ s. d.

## X1.

- (1.) Reduce £90. 18s. 6d. to farthings.
- (2.) Reduce 5967 perches to acres.
- (3.) Subtract five thousand and one from one hundred thousand and ten.
- (4.) Reduce 80 crowns to fourpences.
- (5.) A person spends 9s. 8 $\frac{1}{2}$ d. a day: find his expenses for 95 days?
- (6.) Reduce £95. 15s. to crowns.

## Y1.

- (1.) Reduce 800 crowns to fourpences.
- (2.) Reduce 3964 perches to acres.
- (3.) 15s. 9 $\frac{1}{2}$ d.  $\times$  79.
- (4.) Reduce £365. 2s. 9d. to threepences.
- (5.) Divide £59. 17s. 8d. by 95.
- (6.) Add together: £75. 9s. 6 $\frac{1}{2}$ d., £32. 13s. 8 $\frac{1}{2}$ d., 17s. 6 $\frac{1}{2}$ d., £35. 13s. 8 $\frac{1}{2}$ d., £27. 6s. 8 $\frac{1}{2}$ d., £9050. 8s. 7 $\frac{1}{2}$ d., £735 2s. 7d.

## Z1.

- (1.) How many pence is a person worth who has got 1 guinea, 2 sovereigns, 4 crowns, 6 florins, and 9 sixpences in his purse?
- (2.) Multiply 5 $\frac{1}{2}$ d. by 968.
- (3.) Reduce 596 farthings to shillings.
- (4.) How many fourpences in £50?
- (5.) A person bought 5 articles at 3s. 6d. each, and 9 articles at 1s. 4d. each: how much change should he get out of a £5 note?
- (6.) Take 9 $\frac{1}{2}$ d. from £100.

## SET II.

## A2.

- (.) £67. 5s.  $3\frac{1}{2}d.$   $\times 98.$   
 (.) Take £4979. 15s.  $4\frac{1}{2}d.$  from £29,088. 4s.  $2\frac{1}{2}d.$   
 (.) Divide £70. 11s. equally among 68 people.  
 (.) £517. 19s.  $1\frac{3}{4}d.$   $\times 608.$   
 (.) £100,080. 17s.  $7\frac{1}{2}d.$   $\div 496.$   
 (.) Add together £19. 17s.  $7\frac{1}{2}d.$ , £9. 14s.  $1\frac{1}{2}d.$ , £7090. 15s.  $3\frac{3}{4}d.$ ,  
     £19. 17s.  $7\frac{1}{2}d.$ , £479. 19s.  $10\frac{3}{4}d.$ , and £569. 14s.  $10\frac{3}{4}d.$

## B2.

- (.) Reduce ten thousand and ninety guineas to pounds.  
 (.) Divide £10,124 by 311.  
 (.) Bought 60 lbs. of butter at 1s. 5d. per lb.; half of it was sold at 1s. 6d. per lb., and the remainder at 1s. 8d. per lb.: what was the profit?  
 (.) Fifty men earn 2s. 6d. each, 50 women earn 1s. 3d. each, and 30 children,  $7\frac{1}{2}d.$  each: what are the total earnings?  
 (.) Reduce 132 yards 1 foot 10 inches to inches.  
 (.) Add £7. 14s.  $9\frac{3}{4}d.$ , £92. 5s.  $7\frac{1}{2}d.$ , £2. 14s. 9d., £570. 11s.  $8\frac{1}{2}d.$ , £583, £253. 14s.  $11\frac{1}{2}d.$ , and 16s.  $8\frac{1}{2}d.$

## C2.

- (.) Divide £8604. 8s.  $9\frac{3}{4}d.$  by 68.  
 (.) Divide £8063. 10s. by 630.  
 (.) Reduce 60,900 ounces to tons.  
 (.) What is the difference between 529 guineas and 690 florins? Give your answer in £ s. d.  
 (.) A man earns 530 guineas per annum, and spends £290. 16s.: what does he save per week?  
 (.) £37. 19s.  $6\frac{1}{2}d.$   $\times 510.$

## D2.

- (.) Divide £500. 0s. 10d. equally among 17 persons.  
 (.) Reduce 270,628 feet to miles, furlongs, etc.  
 (.) How many tons, etc., in 706,400 stones?  
 (.) £75. 17s.  $6\frac{1}{2}d.$   $\times 52.$   
 (.) Reduce 916,704 inches to miles, furlongs, etc.  
 (.) Add together £63. 0s.  $11\frac{1}{2}d.$ , 19s.  $6\frac{3}{4}d.$ , £274. 8s.  $7\frac{3}{4}d.$ ,  
     £753. 2s.  $9\frac{3}{4}d.$ , £5. 0s.  $11\frac{1}{2}d.$ , £15, and 17s.  $8\frac{3}{4}d.$

## E2.

- (1.) How many ounces are there in 9 cwts. 3 qrs. 6 lbs. ?
- (2.) The sum of £5 was divided equally between a man and a woman. The man then gave the woman 2s. 6d. How much would each then have ?
- (3.) £19. 14s.  $3\frac{1}{4}d.$   $\times 403.$
- (4.) £678. 9s.  $4\frac{1}{2}d.$   $\div 45.$
- (5.) How many sq. yards are there in 82,782 sq. inches ?
- (6.) How many threepenny pieces are there in £12 ?

## F2.

- (1.) Reduce 17 tons 1 stone 15 lbs. to lbs.
- (2.) Divide £316. 14s.  $10\frac{1}{2}d.$  by 317.
- (3.) £26. 10s.  $5\frac{1}{4}d.$   $\times 37.$
- (4.) Reduce 1 furlong 4 perches 2 yards to yards.
- (5.) From £100 take 17s.  $6\frac{1}{2}d.$
- (6.) Work the following exercise :—  

$$\begin{aligned} & \text{£37. } 11s. 11\frac{1}{4}d. + \text{£56. } 9s. 0\frac{1}{2}d. + 19s. 10d. + \text{£8. } 15s. 3\frac{1}{4}d. \\ & + \text{£170. } 17s. 7\frac{1}{2}d. + \text{£507. } 15s. 5\frac{1}{4}d. + 18s. 2\frac{1}{4}d. \end{aligned}$$

## G2.

- (1.) Divide £135. 8s.  $7\frac{1}{2}d.$  by 137.
- (2.) Reduce 3 tons 1 stone 2 lbs. to lbs.
- (3.) Multiply £69. 4s.  $7\frac{1}{2}d.$  by one hundred and seven.
- (4.) A tea-seller sells tea at 3s. 3d. per lb., and receives £14. 9s. 3d.; how many pounds does he sell ?
- (5.) I changed a £5 note into threepenny pieces; how many did I get ?
- (6.) Subtract 17s.  $6\frac{1}{2}d.$  from £10.

## H2.

- (1.) How many seconds in a leap year ?
- (2.) From £1000 take £5. 8s. 4d., and divide the result by 8.
- (3.) How many drams in 3 cwts. 2 qrs. ?
- (4.) £643. 12s.  $5\frac{1}{4}d.$   $\times 137.$
- (5.) A man has a £5 note, and he buys 6 articles at 7s. 6d. each; 4 at 1s. 6d. each and 12 at 2s. 9d. each; what change should he get ?
- (6.) Add together 17s.  $9\frac{1}{4}d.$ , £246. 0s.  $11\frac{1}{4}d.$ , £17. 17s. 10d., £346. 11s.  $10\frac{1}{2}d.$ , £34. 16s.  $8\frac{1}{4}d.$ , 14s.  $10\frac{1}{4}d.$ , £407. 13s. 8d.

## I2.

- (1.) £19. 19s.  $9\frac{1}{4}d.$   $\times 384.$
- (2.) £3,757. 14s. 6d.  $\div 304.$

- (3.) Reduce 806,409 seconds to weeks.
- (4.) How many half-crowns in 730,080 farthings ?
- (5.) In 3 qrs. 3 ozs. how many ozs. ?
- (6.)  $7,080,972 \div 237$ .

## K2.

- (1.) If £2972. 13s. 9d. be divided equally among 97 men ; how much will each receive ?
- (2.) Multiply £2. 8s.  $6\frac{1}{2}$ d. by 5, and subtract the result from £204. 6s.
- (3.) Reduce 1 year 71 days to hours.
- (4.) How many halfpence are there in 7 half-crowns ?
- (5.) Find the amount in £ s. d. of 5 guineas, 3 half-guineas, 4 crowns, 7 half-crowns, and 9 sixpences.
- (6.) Subtract 13s.  $1\frac{1}{2}$ d. from £20.

## L2.

- (1.) What is the difference in minutes between February in a leap year and the month of August ?
- (2.) How many inches are there in 3 miles ?
- (3.) £40. 14s.  $0\frac{1}{2}$ d.  $\times 160$ .
- (4.) How much in £ s. d. is 1000 guineas greater than £1000 ?
- (5.) A man saves £5. 17s. 6d. every month ; how much does he save in a year ?
- (6.) Add together £19. 19s. 9d., £37. 14s.  $11\frac{1}{2}$ d., 10s. 9d., £56. 14s.  $7\frac{3}{4}$ d., £58. 13s. 10d., £3. 16s. 8d., £16. 0s.  $0\frac{3}{4}$ d.

## M2.

- (1.) Divide seven hundred and fifty-one thousand and ten by 89.
- (2.) Take £817. 0s.  $3\frac{1}{2}$ d. from £6070. 5s.  $10\frac{1}{4}$ d.
- (3.) £4719. 17s.  $10\frac{3}{4}$ d.  $\div 87$ .
- (4.) A man had 5 ten-pound notes ; he spent £3. 17s. at one shop, and £37. 10s. 6d. at another : how much had he left ?
- (5.) Reduce 1,000,000 ounces to tons.
- (6.) Add together : £303. 13s.  $3\frac{3}{4}$ d., £16. 0s. 6d., 19s.  $1\frac{1}{2}$ d., £38. 14s.  $11\frac{1}{2}$ d., £7. 15s.  $8\frac{1}{2}$ d., £564, £27. 9s.  $8\frac{1}{2}$ d.

## N2.

- (1.) Find the difference between 5 guineas and 10s. 6d., and multiply it by 60.
- (2.)  $80,709 \times 6070$ .

- (a.) A man saves  $3\frac{1}{2}d.$  a day : how much will he save in a year ?  
 (b.) £100,040. 14s. 0*p*d. + 80.  
 (c.) Take £100. 10s. 0*p*d. from nine thousand pounds and four-pence farthing.  
 (d.) £57. 14s. 10*p*d. + £5. 7s. 9*p*d. + £843. 16s. 2*p*d. + £5040. 2s. 11*p*d. + £102. 14s. 7*p*d.

## Q2.

- (a.) John had £1. 18s. 9*d*. and Henry had twice as much : how much had they together ?  
 (b.) A gentleman paid £150 for a carriage and two horses ; the carriage cost £70, and one of the horses £35 : how much did the other horse cost ?  
 (c.) Take £645. 17s. 9*p*d. from thirteen thousand pounds.  
 (d.) How many halfpence in 75 half-crowns ?  
 (e.) How many minutes in 526 days 14 hours ?  
 (f.) Multiply 15s. 9*p*d. by 760.

## P2.

- (a.) Multiply ninety-four thousand and ninety by seven hundred and eighteen.  
 (b.) A man bought a pair of trousers for 18s. 6*d*., a coat and a waistcoat for 37s., and a dozen collars for 7s. : what change had he out of a £5 note ?  
 (c.) Take £410. 18s. 4*p*d. from £200,000.  
 (d.) How many weeks, etc., are equal to 71,640 minutes ?  
 (e.) Reduce 39,751 half-crowns to threepenny pieces.  
 (f.) Find the cost of 90 pairs of gloves at 2s. 11*p*d. per pair.

## Q2.

- (a.) Divide four hundred and one thousand eight hundred and forty by sixty-eight.  
 (b.) From £20,000. 0s. 5*d*. take  $7\frac{1}{2}d.$   
 (c.) Two boxes each containing 270 oranges are to be divided among 45 scholars : how many will each receive ?  
 (d.) £6023. 10s.  $\div$  96.  
 (e.) Bring 51 guineas to sixpences.  
 (f.) Reduce 3 tons 10 cwts. to stones.

## R2.

- (a.) Reduce 7 tons 15 lbs. to lbs.  
 (b.) How many weeks, 104 seconds ?  
 (c.) How much is 13  $\frac{3}{4}$ d. ?

- (4.) Four men wish to save £168; one saved £43. 12s. 5d., the second did not save anything, and the third saved £17. 0s. 4½d.: what must the fourth save?
- (5.) £127. 19s. 7½d. ÷ 13.
- (6.) Add together: £250. 15s. 5½d., 4s. 7d., £707. 3s. 0½d., £19. 0s. 3½d., £217. 16s. 11½d., 17s. 11¼d., and £187. 7s. 0¾d.

## S2.

- (1.) Subtract £7008. 0s. 7½d. from £10,000.
- (2.) Divide £25,383. 5s. 1d. by 28.
- (3.) Divide sixty-six thousand and one by sixty-seven.
- (4.) I have got half-a-crown, and I buy 26 apples at a farthing each and 24 oranges at a halfpenny each: how much change should I get?
- (5.) Reduce 16 cwt. 24 lbs. to stones.
- (6.) £805. 13s. 7½d. × 59.

## T2.

- (1.) £70,190. 0s. 4d. - £580. 18s. 7½d.
- (2.) £5,278. 14s. 3½d. ÷ 69.
- (3.) Multiply £23. 6s. 8½d. by 219.
- (4.) How many seconds in the month of April?
- (5.) Reduce 1000 half-guineas to fourpences.
- (6.) How many crowns in 1000 guineas?

## V2.

- (1.) A woman bought 11 yards of stuff to make a dress with at 2s. 3d. a yard, and she paid the dressmaker 2s. 4d. a day for 2½ days: what did the dress cost her?
- (2.) Reduce 105 guineas to farthings.
- (3.) How many seconds in 5 weeks 3 days 15 hours 17 min.?
- (4.) Reduce 75 half-crowns to half-pence.
- (5.) A man had £10; he gave 3d. each to 740 children in a school: how much had he left?
- (6.) A man has a guinea, a sovereign, a crown, and a florin in his purse: what is the value of his money in pence?

# ARITHMETICAL TABLES.

## Addition Table.

| 8 and    | 9 and    | 4 and    | 5 and    | 6 and    |
|----------|----------|----------|----------|----------|
| 1 are 9  | 1 are 10 | 1 are 5  | 1 are 6  | 1 are 7  |
| 2 .. 10  | 2 .. 11  | 2 .. 6   | 2 .. 7   | 2 .. 8   |
| 3 .. 11  | 3 .. 12  | 3 .. 7   | 3 .. 8   | 3 .. 9   |
| 4 .. 12  | 4 .. 13  | 4 .. 8   | 4 .. 9   | 4 .. 10  |
| 5 .. 13  | 5 .. 14  | 5 .. 9   | 5 .. 10  | 5 .. 11  |
| 6 .. 14  | 6 .. 15  | 6 .. 10  | 6 .. 11  | 6 .. 12  |
| 7 .. 15  | 7 .. 16  | 7 .. 11  | 7 .. 12  | 7 .. 13  |
| 8 .. 16  | 8 .. 17  | 8 .. 12  | 8 .. 13  | 8 .. 14  |
| 9 .. 17  | 9 .. 18  | 9 .. 13  | 9 .. 14  | 9 .. 15  |
| 10 .. 18 | 10 .. 19 | 10 .. 14 | 10 .. 15 | 10 .. 16 |

| 7 and    | 8 and    | 9 and    | 11 and   | 12 and   |
|----------|----------|----------|----------|----------|
| 1 are 8  | 1 are 9  | 1 are 10 | 1 are 12 | 1 are 13 |
| 2 .. 10  | 2 .. 11  | 2 .. 11  | 2 .. 13  | 2 .. 14  |
| 3 .. 11  | 3 .. 12  | 3 .. 12  | 3 .. 14  | 3 .. 15  |
| 4 .. 12  | 4 .. 13  | 4 .. 13  | 4 .. 15  | 4 .. 16  |
| 5 .. 13  | 5 .. 14  | 5 .. 14  | 5 .. 16  | 5 .. 17  |
| 6 .. 14  | 6 .. 15  | 6 .. 15  | 6 .. 17  | 6 .. 18  |
| 7 .. 15  | 7 .. 16  | 7 .. 16  | 7 .. 18  | 7 .. 19  |
| 8 .. 16  | 8 .. 17  | 8 .. 17  | 8 .. 19  | 8 .. 20  |
| 9 .. 17  | 9 .. 18  | 9 .. 18  | 9 .. 20  | 9 .. 21  |
| 10 .. 18 | 10 .. 19 | 10 .. 19 | 10 .. 21 | 10 .. 22 |

## Subtraction Table.

| 2 from     | 3 from     | 4 from     | 5 from     |
|------------|------------|------------|------------|
| 3 leaves 0 | 3 leaves 0 | 4 leaves 0 | 5 leaves 0 |
| 3 .. 1     | 4 .. 1     | 5 .. 1     | 6 .. 1     |
| 4 .. 2     | 5 .. 2     | 6 .. 2     | 7 .. 2     |
| 5 .. 3     | 6 .. 3     | 7 .. 3     | 8 .. 3     |
| 6 .. 4     | 7 .. 4     | 8 .. 4     | 9 .. 4     |
| 7 .. 5     | 8 .. 5     | 9 .. 5     | 10 .. 5    |
| 8 .. 6     | 9 .. 6     | 10 .. 6    | 11 .. 6    |
| 9 .. 7     | 10 .. 7    | 11 .. 7    | 12 .. 7    |
| 10 .. 8    | 11 .. 8    | 12 .. 8    | 13 .. 8    |
| 11 .. 9    | 12 .. 9    | 13 .. 9    | 14 .. 9    |
| 12 .. 10   | 13 .. 10   | 14 .. 10   | 15 .. 10   |

| 6 from     | 7 from     | 8 from     | 9 from     |
|------------|------------|------------|------------|
| 6 leaves 0 | 7 leaves 0 | 8 leaves 0 | 9 leaves 0 |
| 7 .. 1     | 8 .. 1     | 9 .. 1     | 10 .. 1    |
| 8 .. 2     | 9 .. 2     | 10 .. 2    | 11 .. 2    |
| 9 .. 3     | 10 .. 3    | 11 .. 3    | 12 .. 3    |
| 10 .. 4    | 11 .. 4    | 12 .. 4    | 13 .. 4    |
| 11 .. 5    | 12 .. 5    | 13 .. 5    | 14 .. 5    |
| 12 .. 6    | 13 .. 6    | 14 .. 6    | 15 .. 6    |
| 13 .. 7    | 14 .. 7    | 15 .. 7    | 16 .. 7    |
| 14 .. 8    | 15 .. 8    | 16 .. 8    | 17 .. 8    |
| 15 .. 9    | 16 .. 9    | 17 .. 9    | 18 .. 9    |
| 16 .. 10   | 17 .. 10   | 18 .. 10   | 19 .. 10   |

# Multiplication Table.

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|   |  |  |
|---|--|--|
| <b>Twice</b><br>1 are 2<br>2 " 4<br>3 " 6<br>4 " 8<br>5 " 10 s. d.<br>6 " 12 .. 1 0<br>7 " 14 .. 1 2<br>8 " 16 .. 1 4<br>9 " 18 .. 1 6<br>10 " 20 .. 1 8<br>11 " 22 .. 1 10<br>12 " 24 .. 2 0   | <b>3 times</b><br>1 are 3<br>2 " 6<br>3 " 9 s. d.<br>4 " 12 .. 1 0<br>5 " 15 .. 1 3<br>6 " 18 .. 1 6<br>7 " 21 .. 1 9<br>8 " 24 .. 2 0<br>9 " 27 .. 2 3<br>10 " 30 .. 2 6<br>11 " 33 .. 2 9<br>12 " 36 .. 3 0                          | <b>4 times</b><br>1 are 4<br>2 " 8 s. d.<br>3 " 12 .. 1 0<br>4 " 16 .. 1 4<br>5 " 20 .. 1 8<br>6 " 24 .. 2 0<br>7 " 28 .. 2 4<br>8 " 32 .. 2 8<br>9 " 36 .. 3 0<br>10 " 40 .. 3 4<br>11 " 44 .. 3 8<br>12 " 48 .. 4 0                |
| <b>5 times</b><br>1 are 5<br>2 " 10 s. d.<br>3 " 15 .. 1 3<br>4 " 20 .. 1 8<br>5 " 25 .. 2 1<br>6 " 30 .. 2 6<br>7 " 35 .. 2 11<br>8 " 40 .. 3 4<br>9 " 45 .. 3 9<br>10 " 50 .. 4 2<br>11 " 55 .. 4 7<br>12 " 60 .. 5 0               | <b>6 times</b><br>1 are 6 s. d.<br>2 " 12 .. 1 0<br>3 " 18 .. 1 6<br>4 " 24 .. 2 0<br>5 " 30 .. 2 6<br>6 " 36 .. 3 0<br>7 " 42 .. 3 6<br>8 " 48 .. 4 0<br>9 " 54 .. 4 6<br>10 " 60 .. 5 0<br>11 " 66 .. 5 6<br>12 " 72 .. 6 0          | <b>7 times</b><br>1 are 7 s. d.<br>2 " 14 .. 1 3<br>3 " 21 .. 1 9<br>4 " 28 .. 2 4<br>5 " 35 .. 2 11<br>6 " 42 .. 3 6<br>7 " 49 .. 4 1<br>8 " 56 .. 4 8<br>9 " 63 .. 5 3<br>10 " 70 .. 5 10<br>11 " 77 .. 6 5<br>12 " 84 .. 7 0      |
| <b>8 times</b><br>1 are 8 s. d.<br>2 " 16 .. 1 4<br>3 " 24 .. 2 0<br>4 " 32 .. 2 8<br>5 " 40 .. 3 4<br>6 " 48 .. 4 0<br>7 " 56 .. 4 8<br>8 " 64 .. 5 4<br>9 " 72 .. 6 0<br>10 " 80 .. 6 8<br>11 " 88 .. 7 4<br>12 " 96 .. 8 0         | <b>9 times</b><br>1 are 9 s. d.<br>2 " 18 .. 1 6<br>3 " 27 .. 2 3<br>4 " 36 .. 3 0<br>5 " 45 .. 3 9<br>6 " 54 .. 4 6<br>7 " 63 .. 5 3<br>8 " 72 .. 6 0<br>9 " 81 .. 6 9<br>10 " 90 .. 7 6<br>11 " 99 .. 8 3<br>12 " 108 .. 9 0         | <b>10 times</b><br>1 are 10 s. d.<br>2 " 20 .. 1 8<br>3 " 30 .. 2 6<br>4 " 40 .. 3 4<br>5 " 50 .. 4 2<br>6 " 60 .. 5 0<br>7 " 70 .. 5 10<br>8 " 80 .. 6 8<br>9 " 90 .. 7 6<br>10 " 100 .. 8 4<br>11 " 110 .. 9 2<br>12 " 120 .. 10 0 |
| <b>11 times</b><br>1 are 11 s. d.<br>2 " 22 .. 1 10<br>3 " 33 .. 2 9<br>4 " 44 .. 3 8<br>5 " 55 .. 4 7<br>6 " 66 .. 5 6<br>7 " 77 .. 6 5<br>8 " 88 .. 7 4<br>9 " 99 .. 8 3<br>10 " 110 .. 9 2<br>11 " 121 .. 10 1<br>12 " 132 .. 11 0 | <b>12 times</b><br>1 are 12 s. d.<br>2 " 24 .. 2 0<br>3 " 36 .. 3 0<br>4 " 48 .. 4 0<br>5 " 60 .. 5 0<br>6 " 72 .. 6 0<br>7 " 84 .. 7 0<br>8 " 96 .. 8 0<br>9 " 108 .. 9 0<br>10 " 120 .. 10 0<br>11 " 132 .. 11 0<br>12 " 144 .. 12 0 |  |

## Division Table.

| Two<br>into   | Three<br>into | Four<br>into | Five<br>into   | Six<br>into    |
|---------------|---------------|--------------|----------------|----------------|
| 2 = 1         | 3 = 1         | 4 = 1        | 5 = 1          | 6 = 1          |
| 4 = 2         | 6 = 2         | 8 = 2        | 10 = 2         | 12 = 2         |
| 6 = 3         | 9 = 3         | 12 = 3       | 15 = 3         | 18 = 3         |
| 8 = 4         | 12 = 4        | 16 = 4       | 20 = 4         | 24 = 4         |
| 10 = 5        | 15 = 5        | 20 = 5       | 25 = 5         | 30 = 5         |
| 12 = 6        | 18 = 6        | 24 = 6       | 30 = 6         | 36 = 6         |
| 14 = 7        | 21 = 7        | 28 = 7       | 35 = 7         | 42 = 7         |
| 16 = 8        | 24 = 8        | 32 = 8       | 40 = 8         | 48 = 8         |
| 18 = 9        | 27 = 9        | 36 = 9       | 45 = 9         | 54 = 9         |
| 20 = 10       | 30 = 10       | 40 = 10      | 50 = 10        | 60 = 10        |
| 22 = 11       | 33 = 11       | 44 = 11      | 55 = 11        | 66 = 11        |
| 24 = 12       | 36 = 12       | 48 = 12      | 60 = 12        | 72 = 12        |
| Seven<br>into | Eight<br>into | Nine<br>into | Eleven<br>into | Twelve<br>into |
| 7 = 1         | 8 = 1         | 9 = 1        | 11 = 1         | 12 = 1         |
| 14 = 2        | 16 = 2        | 18 = 2       | 22 = 2         | 24 = 2         |
| 21 = 3        | 24 = 3        | 27 = 3       | 33 = 3         | 36 = 3         |
| 28 = 4        | 32 = 4        | 36 = 4       | 44 = 4         | 48 = 4         |
| 35 = 5        | 40 = 5        | 45 = 5       | 55 = 5         | 60 = 5         |
| 42 = 6        | 48 = 6        | 54 = 6       | 66 = 6         | 72 = 6         |
| 49 = 7        | 56 = 7        | 63 = 7       | 77 = 7         | 84 = 7         |
| 56 = 8        | 64 = 8        | 72 = 8       | 88 = 8         | 96 = 8         |
| 63 = 9        | 72 = 9        | 81 = 9       | 99 = 9         | 108 = 9        |
| 70 = 10       | 80 = 10       | 90 = 10      | 110 = 10       | 120 = 10       |
| 77 = 11       | 88 = 11       | 99 = 11      | 121 = 11       | 132 = 11       |
| 84 = 12       | 96 = 12       | 108 = 12     | 132 = 12       | 144 = 12       |

## Money Table.

- 4 farthings or 2 half-pennies = 1 penny.  
 12 pence = 1 shilling.  
 2 shillings = 1 florin.  
 2 shillings and sixpence = 1 half-crown.  
 5 shillings = 1 crown.  
 20 shillings = 1 pound.  
 21 shillings = 1 guinea.  
*£ s. d.* signify pounds, shillings, and pence respectively.

## Farthings Table.

|             | <i>d.</i> |  | <i>d.</i>   |     | <i>d.</i>    |     |
|-------------|-----------|--|-------------|-----|--------------|-----|
| 4 farthings | =1        |  | 9 farthings | =2½ | 18 farthings | =4½ |
| 5 "         | =1½       |  | 10 "        | =2½ | 24 "         | =6  |
| 6 "         | =1¾       |  | 11 "        | =2¼ | 30 "         | =7½ |
| 7 "         | =1½       |  | 12 "        | =3  | 36 "         | =9  |
| 8 "         | =2        |  |             |     |              |     |

## Pence Table.

| <i>d.</i>  | <i>s.</i> <i>d.</i> | <i>d.</i>  | <i>s.</i> <i>d.</i> | <i>d.</i>  | <i>s.</i> <i>d.</i> |
|------------|---------------------|------------|---------------------|------------|---------------------|
| 12 are 1 0 |                     | 31 are 2 7 |                     | 51 are 4 3 |                     |
| 13 " 1 1   |                     | 32 " 2 8   |                     | 52 " 4 4   |                     |
| 14 " 1 2   |                     | 33 " 2 9   |                     | 53 " 4 5   |                     |
| 15 " 1 3   |                     | 34 " 2 10  |                     | 54 " 4 6   |                     |
| 16 " 1 4   |                     | 35 " 2 11  |                     | 55 " 4 7   |                     |
| 17 " 1 5   |                     | 36 " 3 0   |                     | 56 " 4 8   |                     |
| 18 " 1 6   |                     | 37 " 3 1   |                     | 57 " 4 9   |                     |
| 19 " 1 7   |                     | 38 " 3 2   |                     | 58 " 4 10  |                     |
| 20 " 1 8   |                     | 39 " 3 3   |                     | 59 " 4 11  |                     |
|            |                     | 40 " 3 4   |                     | 60 " 5 0   |                     |
| 21 " 1 9   |                     | 41 " 3 5   |                     | 61 " 5 1   |                     |
| 22 " 1 10  |                     | 42 " 3 6   |                     | 62 " 5 2   |                     |
| 23 " 1 11  |                     | 43 " 3 7   |                     | 63 " 5 3   |                     |
| 24 " 2 0   |                     | 44 " 3 8   |                     | 64 " 5 4   |                     |
| 25 " 2 1   |                     | 45 " 3 9   |                     | 65 " 5 5   |                     |
| 26 " 2 2   |                     | 46 " 3 10  |                     | 66 " 5 6   |                     |
| 27 " 2 3   |                     | 47 " 3 11  |                     | 67 " 5 7   |                     |
| 28 " 2 4   |                     | 48 " 4 0   |                     | 68 " 5 8   |                     |
| 29 " 2 5   |                     | 49 " 4 1   |                     | 69 " 5 9   |                     |
| 30 " 2 6   |                     | 50 " 4 2   |                     | 70 " 5 10  |                     |

## Shillings Table.

| <i>s.</i>    | <i>£</i> <i>s.</i> <i>d.</i> | <i>s.</i>    | <i>£</i> <i>s.</i> <i>d.</i> | <i>s.</i>      | <i>£</i> <i>s.</i> <i>d.</i> |
|--------------|------------------------------|--------------|------------------------------|----------------|------------------------------|
| 20 are 1 0 0 |                              | 80 are 4 0 0 |                              | 150 are 7 10 0 |                              |
| 30 " 1 10 0  |                              | 90 " 4 10 0  |                              | 160 " 8 0 0    |                              |
| 40 " 2 0 0   |                              | 100 " 5 0 0  |                              | 170 " 8 10 0   |                              |
| 50 " 2 10 0  |                              | 110 " 5 10 0 |                              | 180 " 9 0 0    |                              |
| 60 " 3 0 0   |                              | 120 " 6 0 0  |                              | 190 " 9 10 0   |                              |
| 70 " 3 10 0  |                              | 130 " 6 10 0 |                              | 200 " 10 0 0   |                              |
|              |                              | 140 " 7 0 0  |                              |                |                              |

## TABLES OF WEIGHTS AND MEASURES.

## Avoirdupois Weight.

|                    |   |
|--------------------|---|
| 16 drams (drs.)    | = 1 ounce (1 oz.).  |
| 16 ounces          | = 1 pound (1 lb.).  |
| 14 pounds          | = 1 stone (1 st.).  |
| 2 stones or 28     | { = 1 quarter (of<br>pounds) { = a hundred-<br>weight (1 qr.) |
| 4 quarters or 112  | { = 1 hundred-<br>pounds { weight (1 cwt.)                    |
| 20 hundred-weights | = 1 ton (1 ton).  |

This weight is used for nearly all trading purposes.

## Troy Weight.

|           |                           |
|-----------|---------------------------|
| 24 grains | = 1 pennyweight (1 dwt.). |
| 20 dwts.  | = 1 ounce (1 oz.).        |
| 12 oz.    | = 1 pound (1 lb.).        |

This table is used by silversmiths for gold, silver, and precious stones.

The pound Avoirdupois contains 7000 grains, while the pound Troy contains only 5760 grains. The ounce Avoirdupois, however, contains only 437½ grains, while the ounce Troy contains 480 grains.

**Time Table.**

|            |                  |
|------------|------------------|
| 60 seconds | = 1 minute.      |
| 60 minutes | = 1 hour.        |
| 24 hours   | = 1 day.         |
| 7 days     | = 1 week.        |
| 4 weeks    | = 1 month.       |
| 12 months  | = 1 year.        |
| 365 days   | = 1 common year. |
| 366 days   | = 1 leap year.   |
| 100 years  | = 1 century.     |

If a year is exactly divisible by 4, it is a leap year, and there are 366 days in it. However, if the year is not exactly divisible, it is not a leap year, unless the number of centuries is exactly divisible by 4. For example, 1800 was a leap year, as 1800 was evenly divisible by 4; but 1700 was not, so it is not exactly divisible by 4.

The extra day in every year is given to February, which then has 29 days.

The following table will help you to remember the number of days in each month:

Thirty days hath September,  
April, June, and November.  
All the rest have thirty-one;  
Save February, which alone  
Hath twenty-eight, and the day  
more.  
We add to it one year in four.

**Long Measure.**

|            |                                       |
|------------|---------------------------------------|
| 12 inches  | = 1 foot.                             |
| 3 feet     | = 1 yard.                             |
| 5½ yards   | = 1 rod, pole, or perch<br>(English). |
| 7 yards    | = 1 furlong (Irish).                  |
| 40 perches | = 1 furlong.                          |
| 8 furlongs | = 1 mile.                             |
| 3 miles    | = 1 league.                           |

There are 6 feet in a fathom; 22 yards or 100 links = 1 chain; 1760 yards = 1 English or statute mile.

**Cubio Measure.**

|                   |                 |
|-------------------|-----------------|
| 1728 cubic inches | = 1 cubic foot  |
| 27 cubic feet     | = 1 cubic yard. |

**Square Measure.**

|                    |               |
|--------------------|---------------|
| 144 square inches  | = 1 sq. foot. |
| 9 square feet      | = 1 sq. yard. |
| 144 square yards   | = 1 sq. perch |
|                    | (English).    |
| 144 square yards   | = 1 rood.     |
| 160 square perches | = 1 acre.     |
| 640 acres          | = 1 sq. mile. |

**Capacity.**

|             |              |
|-------------|--------------|
| 2 pints     | = 1 quart.   |
| 4 quarts    | = 1 gallon.  |
| 8 gallons   | = 1 peck.    |
| 16 pecks    | = 1 bushel.  |
| 32 bushels  | = 1 quarter. |
| 64 quarters | = 1 load.    |

**Cloth Measure.**

|            |                        |
|------------|------------------------|
| 12 inches  | = 1 nail.              |
| 4 nails    | = 1 quarter of a yard. |
| 4 quarters | = 1 yard.              |
| 16 inches  | = 1 Flemish ell.       |
| 4 quarters | = 1 English ell.       |
| 9 quarters | = 1 French ell.        |

**Apothecaries' Weight.**

|            |              |
|------------|--------------|
| 20 grains  | = 1 scrupia. |
| 3 scruples | = 1 dram.    |
| 3 drams    | = 1 ounce.   |
| 12 ounces  | = 1 pound.   |

This is the weight used by chemists.

**Table of Constants.**

|               |                      |
|---------------|----------------------|
| 7000 grains   | = 1 lb. Avoirdupois. |
| 5760 grains   | = 1 lb. Troy.        |
| 480 grains    | = 1 oz. Troy.        |
| 487½ grains   | = 1 oz. Avoirdupois. |
| 1760 yards    | = 1 Eng. mile.       |
| 2240 yards    | = 1 Irish mile.      |
| 2240 lbs.     | = 1 ton.             |
| 640 sq. acres | = 1 sq. mile.        |

THE  
IRISH SCHOOL ARITHMETIC.  
PART II.

---

WEIGHTS AND MEASURES.

REDUCTION.

Exercise 1.

- (1.) Reduce 9,123,456 seconds to weeks.
- (2.) Reduce 1,980,737 minutes to months (4 weeks = 1 month).
- (3.) Reduce 7 gallons 3 quarts to pints.
- (4.) Reduce 15,006,060 noggins to gallons, &c.
- (5.) How many pints in 9 gallons 2 quarts?
- (6.) Reduce 8 gallons 1 quart to pints.
- (7.) How many noggins in 1624 gallons?
- (8.) Reduce 1,000,019 ounces to tons, &c.
- (9.) How many lbs. in 5 tons 5 cwts.?
- (10.) Reduce 700,005 lbs. to stones, &c.
- (11.) How many lbs. in 19 tons?
- (12.) Reduce 60,000 lbs. to tons, cwts., &c.
- (13.) How many lbs. are there in 40 tons 15 cwts.?
- (14.) Reduce 3 stones 7 lbs. to ounces.
- (15.) Reduce 1700 lbs. to cwts. qrs., &c.
- (16.) A steam-hammer weighs 13,609 lbs. How many tons, &c., is that?
- (17.) How many tons, &c., in 7,000,007 lbs.?
- (18.) How many stones are there in 56,014 lbs.?
- (19.) How many lbs. are there in 50 tons?
- (20.) Reduce 19,000,001 drs. to stones, &c.
- (21.) A beam weighs 15 tons 16 cwts. 3 qrs. 17 lbs. What is its weight in lbs.?
- (22.) Reduce 3,000,007 drs. to cwts., &c.
- (23.) Reduce 7 tons 0 cwt. 7 stones to lbs.
- (24.) How many stones, &c., are there in 7015 ozs.?  
*(906)*

1. Area.

1.

2.

3.

4.

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92.

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94.

95.

Ans: 10. Volume.

1. Volume = area x height

2. Volume = area x height

3. Volume = area x height

4. Volume = area x height

5. Volume = area x height

6. Volume = area x height

7. Volume = area x height

8. Volume = area x height

9. Volume = area x height

10. Volume = area x height

11. Volume = area x height

12. Volume = area x height

13. Volume = area x height

14. Volume = area x height

15. Volume = area x height

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95. Volume = area x height

96. Volume = area x height

97. Volume = area x height

98. Volume = area x height

99. Volume = area x height

100. Volume = area x height

- (67.) How many seconds are there from Christmas to New-year's day, both days excluded?
- (68.) How many hours are there from 12 noon on Tuesday to 9 P.M. on Friday?
- (69.) How many seconds are there in a solar year (365 days 5 hrs. 48 min. 50 secs.)?
- (70.) How many seconds are there in the month of February (leap year)?
- (71.) How many hours were there in the year 1888?
- (72.) How many days are there from 6th August to 19th January?
- (73.) Reduce 29 days 12 hrs. 44 min. 3 sec. to seconds.
- (74.) How many minutes are there in a fortnight?
- (75.) How many seconds are there in the month of July?
- (76.) Reduce 5,983,765 min. to years, months, &c.
- (77.) Reduce 597,864 min. to years, days, &c.
- (78.) Reduce 64 qrs. 5 bush. 3 pks. to gallons.
- (79.) Reduce 129 qrs. 7 bush. 3 pks. to pints.
- (80.) Reduce 51,973 pints to bushels, &c.
- (81.) How many gallons, &c., in 8345 noggins?
- (82.) Reduce 12,734 qts. to qrs., &c.
- (83.) How many bushels, &c., are there in 11,096 pints?
- (84.) Reduce 19 cu. ft. to cu. inches.
- (85.) Reduce 25 yards 3 qrs. 2 nails to nails.
- (86.) Reduce 3729 yards to nails.
- (87.) Reduce 8 cu. yds. 0 cu. ft. 469 cu. in. to cubic inches.
- (88.) Reduce 20 cu. ft. 168 cu. inches to cubic inches.
- (89.) Reduce 216,000 cu. inches to cu. yards.
- (90.) Reduce 70 cu. yards 18 cu. ft. to cu. inches.
- (91.) How many cu. yards in 1,728,000 cu. inches?
- (92.) Reduce 746,496 cu. inches to cu. yards.
- (93.) How many nails in 8396 English ells?
- (94.) Reduce 9 cu. yds. 16 cu. ft. 862 cu. in. to cu. inches.
- (95.) Reduce 12,345 nails to Flemish ells.
- (96.) How many nails in 9372 French ells?
- (97.) Reduce 1234 English ells to yards.
- (98.) Reduce 9364 yards to French ells.
- (99.) Reduce 9366 Troy lbs. to Avoirdupois lbs.
- (100.) Reduce 672 Avoirdupois lbs. to Troy lbs.
- (101.) Reduce 752 Troy ounces to Avoir. ozs.
- (102.) In 986 ounces Avoir. how many Troy ozs.?
- (103.) Reduce 752 Troy lbs. to lbs. Avoir.
- (104.) In 1504 Troy ounces how many ounces Avoir.?
- (105.) Reduce 876 Avoir. lbs. to Troy lbs.
- (106.) Reduce 87 lbs. 8 ozs. 12 dwts. 3 grs. to Avoir. lbs.

- (107.) Reduce 14 miles (Irish) to English miles.  
 (108.) Reduce 27 miles 3 fur. 10 per. Statute measure to Irish measure.  
 (109.) Reduce 150 mls. 2 fur. (Irish) to Statute measure.  
 (110.) Reduce 879 mls. 3 fur. 8 per. Statute measure to Irish.  
 (111.) In 90 acs. (Irish) how many English acres, &c.?  
 (112.) How many Irish acres, &c., in 160 acs. 3 roods English?  
 (113.) In 4006 pecks how many quarters?  
 (114.) How many English ellis in 98,745 yards?  
 (115.) Reduce 55 reams to sheets.  
 (116.) How many quires in 9000 sheets?  
 (117.) Reduce 937 ounces to scruples.  
 (118.) Reduce 93,760 scruples to lbs., ozs., &c.  
 (119.) Reduce 355 lbs. to scruples.  
 (120.) How many lbs., &c., in 3968 scruples?

## WEIGHTS AND MEASURES.—ADDITION.

## Exercise 2.

(1.)

| tons. | cwts. | qrs. | lbs. |
|-------|-------|------|------|
| 679   | 3     | 2    | 15   |
|       | 1     | 1    | 19   |
| 19    | 17    | 0    | 11   |
| 35    | 12    | 3    | 8    |
| 9     | 1     | 1    | 13   |

(2.)

| mls. | fur. | per. | yds. | feet. | in. |
|------|------|------|------|-------|-----|
| 318  | 2    | 5    | 3    | 2     | 6   |
| 17   | 0    | 18   | 4    | 1     | 9   |
| 6    | 7    | 35   | 2    | 0     | 8   |
| 413  | 1    | 17   | 0    | 1     | 11  |
| 6    | 2    | 23   | 1    | 1     | 6   |

- (3.) Add together:—12 ac. 3 rds. 15 per.; 135 ac. 1 rd. 37 per.; 2 rds. 32 per.; 45 ac. 3 rds. 17 per.; 817 ac. 10 per.  
 (4.) 12 days 17 hrs. 18 min. 30 sec.; 19 hrs. 15 min. 7 secs.; 67 days 18 hrs. 19 min. 12 secs.; 90 days 1 hr. 25 min. 7 secs.; 350 days 18 hrs. 0 min. 12 secs.  
 (5.) 7 bus. 2 pks. 3 gals. + 39 bus. 1 pk. 1 gal. + 916 bus. 1 gal. + 5 bus. 3 pks. 3 gals. + 2 pks. 2 gals.

- (6.) 49 years 217 days 13 hrs. + 30 yrs. 50 days 18 hrs. + 99 yrs. 12 days 12 hrs. + 77 yrs. 13 days 9 hrs. + 576 yrs. 19 hrs.
- (7.) 16 tons 13 cwts. 18 lbs. + 19 cwts. 3 qrs. 12 lbs. + 27 tons 8 cwts. 2 qrs. + 5 cwts. 1 qr. 11 lbs. + 916 tons 3 cwts. 3 qrs. 3 lbs.
- (8.) 12 lbs. 3 ozs. 6 dwts. 18 grs. + 18 dwts. 12 grs. + 372 lbs. 15 dwts. 16 grs. + 17 lbs. 8 ozs. 12 dwts. + 10 ozs. 8 dwts. 13 grs.
- (9.) 12 yds. 2 qrs. 1 nl. + 3 qrs. 2 nls. + 372 yds. 3 qrs. 2 nls. + 97 yds. 1 qr. 3 nls. + 70 yds. 1 qr. 3 nls.
- (10.) 315 yrs. 8 mos. 2 wks. + 17 yrs. 6 mos. 3 wks. + 50 yrs. 3 mos. 3 wks. + 99 yrs. 9 mos. 2 wks. + 888 yrs. 11 mos. 2 wks.
- (11.) 18 lbs. 8 ozs. 8 drs. + 317 lbs. 12 ozs. 13 drs. + 9 lbs. 14 ozs. 14 drs. + 5 lbs. 9 ozs. 9 drs. + 16 lbs. 3 ozs. 3 drs.
- (12.) 77 ac. 3 rds. 15 per. + 1 ac. 3 rds. 35 per. + 976 ac. 2 rds. 27 per. + 1 rd. 18 per. + 6 ac. 3 rds.
- (13.) 12 mls. 3 fur. 17 per. + 318 mls. 6 fur. 17 per. + 2 mls. 7 fur. 27 per. + 84 mls. 5 fur. 19 per. + 88 mls. 5 fur. 9 per.
- (14.) 72 tons 13 cwts. 2 qrs. 5 lbs. + 18 cwts. 1 qr. 13 lbs. + 936 tons 9 cwts. 1 qr. + 15 cwts. 2 qrs. 17 lbs. + 15 tons 15 cwts. 2 qrs. 3 lbs.
- (15.) 9 mls. 2 fur. 13 per. + 5 mls. 3 fur. 18 per. + 379 mls. 7 fur. 37 per. + 5 fur. 20 per. + 15 mls. 5 fur. 17 per.
- (16.) 15 lbs. 2 ozs. 15 dwts. 20 grs. + 9 ozs. 12 dwts. 8 grs. + 314 lbs. 8 ozs. 12 dwts. 12 grs. + 7 ozs. 7 dwts. 7 grs. + 274 lbs. 7 ozs. 8 dwts. 18 grs.

## WEIGHTS AND MEASURES.—SUBTRACTION.

## Exercise 3.

|      | (1.)  |       |      |      |      |
|------|-------|-------|------|------|------|
|      | tons. | cwts. | qrs. | lbs. | ozs. |
| From | 615   | 2     | 3    | 19   | 0    |
| Take | 27    | 13    | 0    | 26   | 8    |

- (2.) 379 tons 19 cwts. 3 qrs. - 18 tons 19 cwts. 3 qrs. 12 lbs.
- (3.) 18 lbs. 2 ozs. 5 dwts. 3 grs. - 6 lbs. 8 ozs. 19 dwts. 12 grs.
- (4.) 37 ac. 2 rds. 12 per. - 18 ac. 3 rds. 35 per.



- (41.) 3 years 8 mos. 2 wks.  $\times$  130.
- (42.) 15 lbs. 1 oz. 3 dwts. 5 grs.  $\times$  79.
- (43.) 12 days 8 hrs. 17 min. 30 sec.  $\times$  165.
- (44.) 15 yds. 2 ft. 6 in.  $\times$  79.
- (45.) 3 yds. 1 qr. 2 nails  $\times$  268.
- (46.) 18 sq. yds. 6 sq. ft. 12 sq. in.  $\times$  78.
- (47.) 12 cwts. 3 qrs. 9 lbs.  $\times$  875.
- (48.) 17 days 8 hrs. 12 min. 8 sec.  $\times$  59.
- (49.) 19 yrs. 6 mos. 3 wks.  $\times$  67.
- (50.) 3 tons 2 cwts. 3 qrs. 17 lbs. 5 ozs.  $\times$  295.

**Exercise 5.**

- (1.) 27 cwts. 2 qrs. 12 lbs.  $\times$  8 $\frac{1}{2}$ .
- (2.) 15 tons 15 cwts. 2 qrs.  $\times$  7 $\frac{1}{4}$ .
- (3.) 55 ac. 3 rds. 30 per.  $\times$  9 $\frac{1}{2}$ .
- (4.) 12 ac. 2 rds. 10 per.  $\times$  12 $\frac{3}{4}$ .
- (5.) 27 days 3 hrs. 30 min.  $\times$  6 $\frac{2}{3}$ .
- (6.) 12 miles 5 fur. 8 per.  $\times$  11 $\frac{1}{2}$ .
- (7.) 37 ac. 2 rds. 16 per.  $\times$  9 $\frac{3}{4}$ .
- (8.) 16 lbs. 10 ozs. 12 dwts.  $\times$  9 $\frac{1}{2}$ .
- (9.) 12 lbs. 13 ozs. 10 drs.  $\times$  8 $\frac{3}{4}$ .
- (10.) 17 ac. 2 rds. 20 per.  $\times$  11 $\frac{1}{2}$ .
- (11.) 315 tons 13 cwts. 2 qrs.  $\times$  1 $\frac{2}{3}$ .
- (12.) 76 yds. 3 qrs. 3 nails  $\times$   $\frac{5}{6}$ .
- (13.) 27 years 2 mos. 3 wks.  $\times$  7 $\frac{1}{2}$ .
- (14.) 33 ac. 3 rds. 15 per.  $\times$  8 $\frac{5}{6}$ .
- (15.) 15 cwts. 2 qrs. 13 lbs.  $\times$  5 $\frac{7}{12}$ .
- (16.) 3 mls. 5 fur. 19 per.  $\times$  1 $\frac{5}{6}$ .
- (17.) 5 tons 17 cwts. 3 qrs.  $\times$  27 $\frac{1}{4}$ .
- (18.) 18 lbs. 2 ozs. 19 dwts. 5 grs.  $\times$  36 $\frac{2}{3}$ .
- (19.) 1 lb. 13 ozs. 13 drs.  $\times$  413 $\frac{3}{4}$ .
- (20.) 3 ac. 2 rds. 15 per.  $\times$  764 $\frac{7}{8}$ .

## WEIGHTS AND MEASURES.—DIVISION.

**Exercise 6.**

Divide each of the following lines by 8, 9, 10, 11, 12:—

- (1- 5.) 206 tons 3 cwts. 2 qrs. 12 lbs.
- (6-10.) 183 mls. 5 fur. 16 per.
- (11-15.) 455 ac. 3 rds. 4 per.
- (16-20.) 189 lbs. 6 ozs. 16 dwts. 12 grs.
- (21-25.) 455 bus. 2 pks. 1 gal. 0 qts.
- (26-30.) 424 cwts. 1 qr. 9 lbs. 13 ozs. 0 drs.

THE USE OF THE LOGARITHM.

1.  $10^{\log 10} = 10$ .  
 2.  $10^{\log 75} = 75$ .  
 3.  $10^{\log 165} = 165$ .  
 4.  $10^{\log 69} = 69$ .  
 5.  $10^{\log 24} = 24$ .  
 6.  $10^{\log 279} = 279$ .  
 7.  $10^{\log 175} = 175$ .  
 8.  $10^{\log 35} = 35$ .  
 9.  $10^{\log 59} = 59$ .  
 10.  $10^{\log 100} = 100$ .  
 11.  $10^{\log 79} = 79$ .  
 12.  $10^{\log 165} = 165$ .  
 13.  $10^{\log 24} = 24$ .  
 14.  $10^{\log 279} = 279$ .  
 15.  $10^{\log 175} = 175$ .  
 16.  $10^{\log 35} = 35$ .  
 17.  $10^{\log 59} = 59$ .  
 18.  $10^{\log 100} = 100$ .

**Exercise 7.**

1.  $10^{\log 75} = 75$ .  
 2.  $10^{\log 165} = 165$ .  
 3.  $10^{\log 69} = 69$ .  
 4.  $10^{\log 24} = 24$ .  
 5.  $10^{\log 279} = 279$ .  
 6.  $10^{\log 175} = 175$ .  
 7.  $10^{\log 35} = 35$ .  
 8.  $10^{\log 59} = 59$ .  
 9.  $10^{\log 100} = 100$ .  
 10.  $10^{\log 79} = 79$ .  
 11.  $10^{\log 165} = 165$ .  
 12.  $10^{\log 24} = 24$ .  
 13.  $10^{\log 279} = 279$ .  
 14.  $10^{\log 175} = 175$ .  
 15.  $10^{\log 35} = 35$ .  
 16.  $10^{\log 59} = 59$ .  
 17.  $10^{\log 100} = 100$ .  
 18.  $10^{\log 79} = 79$ .  
 19.  $10^{\log 165} = 165$ .  
 20.  $10^{\log 24} = 24$ .  
 21.  $10^{\log 279} = 279$ .  
 22.  $10^{\log 175} = 175$ .  
 23.  $10^{\log 35} = 35$ .  
 24.  $10^{\log 59} = 59$ .  
 25.  $10^{\log 100} = 100$ .

**MISCELLANEOUS EXERCISES**  
**ON THE COMPOUND RULES, REDUCTION, AND**  
**WEIGHTS AND MEASURES.**

**Exercise 8.**

- (1.) £643, 12s. 5½d. × 137.
- (2.) £3896, 14s. 2d. ÷ 156.
- (3.) How many seconds in a leap year?
- (4.) Multiply 3 qrs. 21 lbs. by 35.
- (5.) From £1000 take £5, 8s. 4d., and divide the result by 8.
- (6.) How many drams are there in 3½ cwts.?
- (7.) Divide £30,251, 15s. 5d. equally among 25 persons.
- (8.) Reduce 69,487,168 minutes to years of 52 weeks each.
- (9.) 25 tons 3 qrs. 18 lbs. × 27.
- (10.) In a bag there are sovereigns, crowns, florins, and half-pence; and there are 240 of each. What is the value of the whole in £ s. d.
- (11.) 3 stones 3 lbs. × 36.
- (12.) Divide 47 tons 2 qrs. 16 lbs. by 19.
- (13.) Reduce 806,409 seconds to weeks.
- (14.) How many parcels of tea, each containing 7 lbs., can be made out of 3 cwts. 2 qrs. 7 lbs.?
- (15.) Find the sum of:—4 lbs. 3 ozs. 10 drs.; 15 lbs. 5 ozs. 6 drs.; 13 lbs. 2 ozs. 11 drs.; 14 lbs. 4 drs.; and 11 lbs. 2 ozs. 1 dr.
- (16.) What is the difference in minutes between February leap year and February common year?
- (17.) How many seconds in May, June, and July?
- (18.) If £2972, 13s. 9d. be divided equally among 97 men, how much will each receive?
- (19.) Reduce 3,009,011 pints to qrs.
- (20.) The rent of a farm of 857 acres is £2392, 9s. 2d., what is that for 1 ac.?
- (21.) How many inches are there in 3 miles 4 yards 6 inches?
- (22.) How many poor people can get 6s. 3½d. out of £31, 2s. 10½d.?
- (23.) Reduce 1,516,680 poles to miles.
- (24.) How many half-crowns in 730,080 farthings?
- (25.) How many ounces in 3 qrs. 3 ozs.?

- (26.) Multiply £2, 8s. 6 $\frac{1}{2}$ d. by 5, and subtract the result from £204, 6s.
- (27.) 31 cwts. 1 qr. 3 lbs.  $\times$  61.
- (28.) Reduce 7,643,219 sq. poles to sq. miles.
- (29.) How many inches in 3 miles?
- (30.) How many gardens, each containing 16 roods, might be made from a field of 100 acres?
- (31.) Reduce 272,160 minutes to weeks.
- (32.) Find the sum of 5 yards 2 ft. 6 inches; 18 yards 8 ins.; 4 yds. 2 ft. 11 ins.; 20 yds. 1 ft. 9 ins.; 37 yds. 2 ft. 10 ins.; 143 yds. 2 ft. 4 ins.
- (33.) 9715 tons 3 qrs. 4 lbs.  $\div$  78.
- (34.) How many acres in 3 fields, each containing 1120 sq. poles?
- (35.) Reduce 1 year 71 days to hrs.
- (36.) Find the 7th part of 764 tons 13 cwts. 2 qrs. 7 lbs.
- (37.) Reduce one million ounces to tons.
- (38.) Find the difference between 5 guineas and 10s. 6d., and multiply it by 60.
- (39.) What is the difference in minutes between February in a leap year and the month of August?
- (40.) How many half-pence in 7 half-crowns?
- (41.) Add together:—47 years 11 mos. 3 wks.; 71 years 10 mos. 2 wks.; 46 yrs. 9 mos. 3 wks.; 84 years 8 mos. 2 wks.; 90 years 7 mos. 3 wks.
- (42.) Bought 60 lbs. of butter at 1s. 5d. per lb.; half of it was sold at 1s. 6d. per lb. and the remainder at 1s. 8d. per per lb.; what was the profit?
- (43.) Fifty men earn 2s. 6d. each, 50 women earn 1s. 3d. each, and 30 children 7 $\frac{1}{2}$ d. each; what were the total earnings?
- (44.) If oranges are sold at the rate of 2 for 1d., how many can be had for half a sovereign?
- (45.) The sum of £5 was divided equally between a man and a woman. The man then gave the woman 2s. 6d. How much should each then have?
- (46.) If a tea-seller sells tea at 3s. 3d. per lb. and receives £14, 9s. 3d.; how many pounds does he sell?
- (47.) A man made a fence which was 2 furlongs 34 yards long; what did he get for it at the rate of one shilling per foot?
- (48.) Subtract 30,000 ounces from 2 tons. (Give your answer in tons, cwts. &c.)

- (49.) A dealer bought 15 horses at £28, 13s. each; he sold 8 of them at £35 each, and the remainder at £42, 10s. each; find his total gain.
- (50.) How many minutes are there in  $11\frac{1}{2}$  days?
- (51.) If a dollar is worth 4s.  $2\frac{1}{2}$ d., how many dollars are equal to 101 half-crowns?
- (52.) How many grains in 5 oz. 14 dwts. 14 grains?
- (53.) Divide 168 bush. 1 pk. 6 qts. of corn equally among 35 persons.
- (54.) How many steps, each measuring 30 inches, must a person take in walking 10 miles?
- (55.) How many times can a box, holding 4 bush. 3 pks. 2 qts., be filled from 336 bush. 3 pks. 4 qts.?
- (56.) If one acre of land yield 1 ton 9 cwt. 47 lbs. of hay, how much will 18 acres yield?
- (57.) In one hundred and twenty gross how many score?
- (58.) Reduce  $7\frac{1}{2}$  stones to ounces.
- (59.) Reduce  $3\frac{3}{4}$  miles to yards.
- (60.) How often is 5s. 2d. contained in £100?
- (61.) How many yards of cambric at 3s.  $1\frac{1}{2}$ d. a yard can be bought for 15 guineas?
- (62.) How many parcels of tea, each weighing  $3\frac{1}{2}$  lbs., can be made out of 65 lbs.?
- (63.) Which is the dearer,  $7\frac{1}{2}$ d. a lb. or 65s. 6d. per cwt.?
- (64.) If  $8\frac{3}{4}$  yards cost 24s. 6d., what will 1 yard cost?
- (65.) If  $7\frac{5}{16}$  yards cost £5, 18s. 9d., what will 1 yard cost?
- (66.) I paid £4, 15s. 4d. for a piece of linen at 3s. 2d. a yard; how many yards did it contain?
- (67.) If knives are bought at 14s. 8d. per dozen, and sold at 1s. 8d. each; how much will be gained by selling a gross?
- (68.) A labourer has 28s. 6d. a week; how much is that a year?
- (69.) How many parcels of  $7\frac{1}{2}$  lbs. each may be made out of 3 cwts. 16 lbs.?
- (70.) How many yards of cloth at 1s.  $5\frac{1}{2}$ d. per yard may be bought for £56?
- (71.) How often is fivepence contained in 111 guineas?
- (72.) If £615 be divided among 26 men, how much will each receive?
- (73.) If  $26\frac{1}{4}$  yards cost 58s. 9d., what will 1 yard cost?
- (74.) In 34,000 quarters 7 bush. 3 pecks how many gills?

- (75.) How many weeks are there in 100,050 minutes?  
 (76.) In 13 casks, each containing 132 gallons, how many  
 (77.) In 2,401,618 yards how many miles?  
 (78.) In 56 c. yards 20 c. feet 1000 c. in. how many c. in.  
 (79.) Turn 79 weeks 19 hours 37 sec. into seconds.  
 (80.) Turn 7,860,000 pints into quarters.
- 

## SIMPLE PROPORTION.

Ratio is the relation which one number bears to another of the same kind. For example, 4 bears a certain relation to 8, and is written  $4 : 8$ . The first number is called the *Antecedent*, and the second is called the *Consequent*.

To find the value of a Ratio:

Rule: Divide the Antecedent by the Consequent.

### Exercise 9.

Find the value of each of the following Ratios:—

- (1.) 16 : 4.
- (2.) 54 : 6.
- (3.) 81 yards : 3 yards.
- (4.) £15 : £5.
- (5.) 780 feet : 30 feet.
- (6.) £363, 7s. 6d. : £6, 7s. 6d.
- (7.) 75 yards : 12 nails.
- (8.) 14 ac. 1 ro. 15 pchs. : 3 ro. 15 pchs.
- (9.) 223 lbs. 11 ozs. 17 dwts. : 2 lbs. 3 ozs. 3 dwts.
- (10.) 3 wks. 5 dys. 1 hr. 5 mins. : 2 days 5 mins.
- (11.) 455 miles : 3 miles 4 furlongs.
- (12.) 5 qrs. 2 bushels : 3 pkgs. 2 gallons.
- (13.) £11,319 : £231.
- (14.) 30 stones 6 lbs. : 13 lbs. 5 ozs.
- (15.) 375 crowns : 15 half-crowns.
- (16.) 105 tons 17 cwts. 2 qrs. : 27 cwts. 2 qrs.
- (17.) 1140 years : 15 years.
- (18.) £4, 5s. 4d. : 1s. 4d.
- (19.) 3867 qrs. 4 bushels : 4 qrs. 2 bushels.
- (20.) 27,093 acres 3 rds. : 27 acres 15 pchs.

*Proportion* denotes the equality of two Ratios. For ex-

4 bears the same ratio to 8 that 6 yards does to 12 yards, and this is usually expressed as follows:—

$$4 : 8 :: 6 \text{ yds.} : 12 \text{ yds.}$$

and is read 4 is to 8 as 6 yds. is to 12 yds.

The *first* and *fourth* terms of a proportion are called the **EXTREMES**, and the *second* and *third* the **MEANS**.

Simple Proportion is sometimes called the Rule of Three, since it is the rule by which, when three numbers are given, we are required to find a fourth unknown number, which is generally called the missing term.

The finding of the missing term in any given proportion depends upon the following principle:—**THAT THE PRODUCT OF THE EXTREMES = THE PRODUCT OF THE MEANS.** Thus in the following proportion  $4 : 8 :: 6 : 12$

$$4 \times 12 = 6 \times 8.$$

Rule for finding the missing term in any given proportion:

(1) When a *mean* is required we multiply the two extremes together, and divide by the given mean.

(2) When an *extreme* is required we multiply the two means together, and divide by the given extreme.

### Exercise 10.

Find the missing term in each of the following proportions:—

- (1.)  $12 : 8 :: 9 : ?$
- (2.)  $54 : ? :: 66 : 11.$
- (3.)  $? : 8 :: 72 : 9.$
- (4.)  $547 : ? :: 1094 : 72.$
- (5.)  $15s. : £36 :: £50 : ?$
- (6.)  $£12, 7s. 6d. : ? :: £940 : £47.$
- (7.) 15 crowns : £3 :: ? : 836 threepences.
- (8.) £19, 13s. 4d. : ? :: £50 : £300.
- (9.) 1 ac. 2 rds. : ? :: 40 ac. : 35 ac.
- (10.) 12 bus. 3 pks. : 30 qrs. :: ? : 20 bus.
- (11.) 40 florins : 16 half-crowns :: ? : £1.
- (12.) 5 gals. 2 qts. : 11 pks. :: 17 pks. : ?
- (13.) ? : £17, 10s. :: £35 : £100.
- (14.) ? : 12 days 3 hrs. :: 4 weeks : 140 days.
- (15.) 8 ac. 2 rds. : ? :: 37 ac. 15 per. : 148 ac. 1 rd. 20 per.
- (16.) ? : 15 men :: 12 ac. 2 rds. : 37 ac. 2 rds.
- (17.) £21 : £3 :: ? : 18 cwt. 2 qrs.
- (18.) 15 bus. : ? :: £12 : £80.
- (19.) 36 half-crowns : ? :: 14 days : 6 weeks.
- (20.) £357 : ? :: 40 ac. : 160 acres.

Exercise 10.

Find the cost of 12 pears at the same terms that would be paid for 8 pears.

Is there a relation between the cost of 8 pears and the cost of 12 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 16 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 24 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 32 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 40 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 48 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 56 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 64 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 72 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 80 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 88 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 96 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 104 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 112 pears? If so, what is it?

Is there a relation between the cost of 8 pears and the cost of 120 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 16 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 20 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 24 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 30 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 36 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 42 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 48 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 54 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 60 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 66 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 72 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 78 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 84 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 90 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 96 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 102 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 108 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 114 pears? If so, what is it?

Is there a relation between the cost of 12 pears and the cost of 120 pears? If so, what is it?

The division of the sum of £1. 1s. 9d. by 12 is considerably shorter than the division of the sum of £1. 1s. 9d. by 10, because the dividend is being divided by a Common Factor.

This is also true of the case of 12 and 10 will divide 1000 and 10000.

$$\begin{array}{r} 1000 \\ \times 12 \\ \hline 2000 \\ 1000 \\ \hline 3000 \end{array}$$

$$\begin{array}{r} 10000 \\ \times 12 \\ \hline 20000 \\ 10000 \\ \hline 30000 \end{array}$$

Ans. £1. 7s. 1d.

### Exercise 11.

- (1.) If 2 pears cost 8d., what will 10 pears cost?
- (2.) If 3 apples cost 4d., what will 6 apples cost?
- (3.) If 5 pears cost 3d. what will 35 pears cost?

- (1.) If 20 cherries cost  $2d.$ , what will 100 cherries cost?  
 (2.) If 3 lbs. of sugar cost  $4d.$ , what will 33 lbs. cost?  
 (3.) If 7 lbs. of beef cost  $49d.$ , what will 6 lbs. cost?  
 (4.) If 6 articles cost  $8\frac{1}{2}d.$ , what will 42 articles cost?  
 (5.) If 2 collars cost  $10\frac{1}{2}d.$ , what would 10 collars cost?  
 (6.) If 11 bundles cost  $6\frac{3}{4}d.$ , what will 33 bundles cost?  
 (7.) If 39 sheets of paper cost  $3d.$ , what will 13 sheets cost?  
 (8.) If 42 lbs. cost  $9\frac{3}{4}d.$ , what will 14 lbs. cost?  
 (9.) If 2 lbs. of tea cost  $32d.$ , what would 15 lbs. cost?
- 

- (10.) If 7 lbs. of tea cost £1, 5s., what would 49 lbs. cost?  
 (11.) If 11 lbs. of tea cost £7, 7s.  $4\frac{1}{4}d.$ , what will 33 lbs. cost?  
 (12.) If 18 stones cost £9, 10s.  $9\frac{1}{2}d.$ , what will 27 stones cost?  
 (13.) If 5 horses cost £175, what will 2 cost?  
 (14.) If 4 cows cost £88, 10s. 6d., what will 18 cows cost?  
 (15.) If 12 yards cost £10, 12s. 6d., what will 27 yards cost?  
 (16.) If 36 ozs. cost £9, 1s.  $2\frac{1}{4}d.$ , what would 12 ozs. cost?  
 (17.) If 9 cows cost £171, 18s. 9d., what will 4 cost?  
 (18.) If 1001 marbles cost £1, 0s.  $10\frac{1}{4}d.$ , what will 48 marbles cost?  
 (19.) If 111 articles cost 6s. 2d., what will 1 dozen cost?  
 (20.) If a score of sheep cost £35, what would 1 gross cost?  
 (21.) If 199 drawing books cost £1, 17s.  $3\frac{3}{4}d.$ , what would a score and a half cost?
- 

- (22.) If 2 cwts. 1 qr. cost 18s., what will 17 cwts. 3 qrs. cost?  
 (23.) If 3 cwts. 3 qrs. cost £2, 5s., what will 5 cwts. 2 qrs. cost?  
 (24.) If 12 cwts. 1 qr. 14 lbs. cost £2, 17s. 9d., how much must I pay for 6 cwts. 3 qrs. 15 lbs.?  
 (25.) If 1 cwt. 1 qr. cost £1, 3s. 6d., what will 13 cwts. 2 qrs. 27 lbs. cost?  
 (26.) If 16 cwts. 0 qrs. 24 lbs. cost £24, 0s. 8d., find cost of 2 cwts. 0 qrs. 3 lbs.  
 (27.) If 1 cwt. cost 7s., what is the value of 216 cwts. 3 qrs. 22 lbs.?  
 (28.) If 10 lbs. cost £8, what must be paid for 1 ton?  
 (29.) If 2 cwts. 1 qr. cost £81, find price of 4 stones.  
 (30.) If 1 ton cost £2, 6s. 8d., what is the cost of  $4\frac{1}{2}$  cwts.?

- (77.) If an acre cost £33, 10s. 1d., find cost of 440 sq. yards.
- (78.) Find price of 3 chests of tea, each weighing 1 qr. 8 lbs. at 1s. 2d. per lb.
- (79.) There are 25 envelopes in a pack, how many packs are there in 10,000 envelopes?
- (80.) What is the rent of 62 acres 2 roods 12 perches if 10 acres are rented at £22, 10s.?
- (81.) If 1 lb. of meat cost 10d., what is the price of a bullock which weighs 6 cwts.?
- (82.) Find cost of 14 parcels, each containing 63 lbs., at 1s. 2½d. per lb.
- (83.) Find how many acres of land at 15s. 9d. per acre can be rented for £110, 5s.
- (84.) If the wages of 117 men for 9 days be £18, 4s. 6d., find the wages of 13 men for same time.
- (85.) If 4½d. buy a gallon of gooseberries, how many bushels can be bought for £2, 5s.?
- (86.) What is the cost of  $7\frac{1}{2}$  cwt. of snuff at 2½d. per oz.?
- (87.) What will a thousand eggs cost at ½d. each?
- (88.) Find price of 40 dozen bottles of wine at 4s. 9d. per bottle.
- (89.) What should be charged for 50,000 envelopes at 5s. 11½d. per thousand?
- (90.) If 9½d. a dozen be charged for newspapers, what will an issue of 1,200,000 realize?

## INVERSE PROPORTION.

### Exercise 12.

- (1.) If 24 men do a piece of work in 45 days, how many days will 60 men take to do it?
- (2.) If 15 men build a house in 88 days, how many men will be required to do it in 60 days?
- (3.) If 30 men reap a field in 10 days, how many men will do it in 2 days?
- (4.) If 28 persons reap a harvest in 36 days, how many will be required to do it in 12 days?
- (5.) If I borrow £400 for 3 months, how long should I lend £300 in return?

- (58.) If a train travels 54 miles an hour, how long will it be travelling 297 miles?
- (59.) How many yards can I buy for 19s., when 40 yards cost 36s.?
- (60.) 6 yards and 2 qrs. are required to make a boy's suit, how many suits can be made of a piece containing 78 yards?
- (61.) If 3 yds. 2 qrs. 1 nl. cost 17s. 6d., find cost of 28 yds. 2 qrs.
- (62.) Find cost of 2 qrs. 2 nls. of cloth at 14s. 6d. per yard.
- (63.) If 5 acres of land are sold for £170, 18s. 6d., find the cost of 25 acres and 2 roods.
- (64.) If 2 roods 10 poles of land cost £340, what should be charged for 4 acres 3 roods 5 poles?
- (65.) What will be the rent of 596 acres when £11, 5s. is charged for 4 acres 2 roods?
- (66.) A field of 15 acres lets for £29, 12s.; what should be charged for a similar field measuring 3 acres 3 roods?
- (67.) Find the rent of 1 acre 2 roods 8 poles of land, if 3 acres let for £9, 5s.
- (68.) When 17 acres 2 roods cost £104, 10s., find the value of 10 roods and 20 poles.
- (69.) How many cows would eat 21 acres of grass in the same time that 20 cows would eat 15 acres?
- (70.) If 18 men mow a field of grass containing 20 acres 2 roods 16 perches in a certain time, how many men would mow 10 acres 1 rood 8 perches in same?
- (71.) If a pair of horses plough 3 acres 1 rood 27 perches in 4 days, how long would it take them to plough 13 acres 2 roods 28 perches?
- (72.) How many acres of grass would maintain 140 sheep for same time that 3 acres 2 roods would support 26 sheep?
- (73.) If the rent of 14 acres 3 roods 10 perches be £27, 10s., what will be the rent of 44 acres 1 rood 30 perches?
- (74.) If a field containing 6 acres 3 roods 5 perches produce 10 tons 17 cwts., what weight of corn might be expected from 100 acres?
- (75.) How many acres ought to grow 30 tons of wheat, when 1 acre 3 roods 10 perches produce 1 ton 17 cwts. 2 qrs.?
- (76.) If a £5-note pay for the reaping of 17 acres 3 roods 10 perches of corn, how much will pay for reaping 124 acres 2 roods 30 perches?

- (25.) If 38 men can lay 3800 bricks in 4 days, how many could 80 men lay in the same time?
- (26.) A certain amount of food will last 70 men for 20 days, how long will it serve for 100 men?
- (27.) If 10 men can reap 184 acres in 12 days, how many can do it in 3 days?
- (28.) Twenty-five men can do a piece of work in 3 days, how long would it take 9 men to do it?
- (29.) How many men will perform a piece of work in 25 days, which takes 50 men 40 days?
- (30.) If 60 men can cut 2000 trees in 25 days, how many men will do it in 5 days?

### Exercise 13.

- (1.) If 12 men do a piece of work in 45 days, how many days will 30 men take to do it?
- (2.) If 13 cows can eat the grass of a field in 39 days, how long would it graze 65 cows?
- (3.) If 15 masons can build a wall in 26 days, how many could do it in 30 days?
- (4.) If 36 men finish a piece of work in 44 days, how long will it take 60 men?
- (5.) If 13 cwts. 2 qrs. of sugar cost £13, 10s., what weight could be purchased for £67, 10s.?
- (6.) What is the cost of  $1\frac{1}{2}$  cwts. of snuff at  $2\frac{1}{2}d.$  per oz.?
- (7.) What will the wages for 1 year and 3 weeks amount to when 6 weeks' wages come to £4, 17s. 6d.?
- (8.) If the rent of a field containing 4 acres 2 roods be £11, 5s., what is the rent of 596 acres?
- (9.) Find value of 4 silver plates each weighing 3 lbs. 2 ozs. when 2 ozs. 5 dwts. of silver costs 7s.  $10\frac{1}{2}d.$
- (10.) How long will it take 50 men to eat the food which would last 35 men 20 days?
- (11.) If 3 qrs. 7 lbs. of tea cost £11, 7s. 6d., find price of 1 cwt.
- (12.) How many yards of silk at 2s. 6d. per yard must be given in exchange for 51 yards at 4s. per yard?
- (13.) When 17 acres 3 roods cost £104, 9s. 6d., find value of 10 roods 15 per.
- (14.) How much ought I lend a friend for 5 months to repay him for lending me £50 for  $1\frac{1}{2}$  years?

- 25.) If 84 sheep eat the clover off a field in 12 days, how long would it have lasted 112 sheep?
- 26.) If 17 yards of silk cost £4, 8s.  $6\frac{1}{2}d.$ , what will be the cost of 120 yards?
- 27.) If 25 chests of tea weigh 1 ton 3 cwts. 1 qr. 21 lbs., how many chests of the same size will weigh 1 ton 11 cwts. 3 qrs. 14 lbs.?
- 28.) How many yards of cloth worth 18s. 3d. a yard ought to be given in exchange for 24 Eng. ells worth 13s.  $8\frac{1}{4}d.$  per ell?
- 29.) If 13 cwts. 2 qrs. 16 lbs. cost £15, 17s.  $6\frac{1}{2}d.$ , what will be the cost of 3 tons 1 cwt. 1 qr. 16 lbs.?
- 30.) How long will it take 12 men to do a piece of work which 8 men can do in 27 days?
- 31.) When eggs are 24 a shilling, how many must be given in payment of £1, 11s.  $5\frac{1}{2}d.$ ?
- 32.) A labourer gets 13s. 5d. for a week of 7 days; find his wages from 1st April till Christmas-day (both days included).
- 33.) If 3 men can mow a field in  $6\frac{2}{3}$  days, how long will it take 10 men to mow the same field?
- 34.) If 12 bushels of wheat cost £4, 1s. 6d., how much can be bought for £55, 0s. 3d.?
- 35.) What is the value of 40 lbs. standard gold if an ounce cost £3, 17s.  $10\frac{1}{2}d.$ ?
- 36.) How many sovereigns are in 80 lbs. of standard gold, an ounce of standard gold being worth £3, 17s.  $10\frac{1}{2}d.$ ?
- 37.) If 15 yards of silk cost £1, 13s. 9d., how much will 20 yds. 1 ft. cost?
- 38.) If £4, 14s.  $10\frac{1}{2}d.$  buy 288 yards, how many can be bought for £1, 11s.  $7\frac{1}{2}d.$ ?
- 39.) If 45 yards of silk be bought for £29, 18s. 3d., how many will cost £9, 19s. 5d.?
- 40.) If 4 men reap 5 acres 3 roods 39 per. in a certain time, how many men would reap 35 acres 3 roods 34 per. in same time?
- 41.) If 27 cwts. 21 lbs. cost £379, 2s.  $3\frac{1}{4}d.$ , what is the cost of 3 cwts. 3 qrs. 15 lbs.?
- 42.) If the railway fare for a journey 50 miles be 12s. 6d., what is the fare for 120 miles?
- 43.) If 8 men would take 75 days to do a piece of work, how many men would be required to do it in 40 days?

- (34.) How many men in 19 days would do a piece which 171 men could do in 12 days?
- (35.) What should a person's salary be from March June 3rd inclusive, at the rate of £410, 12s. 6d.
- (36.) How far can 48 tons be carried for the same would be paid for carrying 36 tons for 144 miles?
- (37.) If a coach travels at the rate of  $7\frac{1}{2}$  miles per hour will it have gone between 10.45 A.M. and 5 P.M.?
- (38.) If the price of 3000 copies of a book be £4725, will the sale of 1937 copies produce?
- (39.) The expenses of making the hay of 5 acres 3 per. amount to £6, 1s. 2d.; find the expense per acre.
- (40.) If 18 gals. of beer cost £1, 1s., what is the cost of 100 gals.?
- (41.) If 18 yards of cloth cost £15, 10s. 6d., how much will 3 $\frac{1}{4}$  yards cost?
- (42.) If 9 acres 1 rood 32 per. of pasture suffice for 100 sheep, how much will suffice for a flock of 480?
- (43.) If 6 acres 3 roods 18 per. be let for £21, 9s. 9d., what is the rent of 34 acres 1 rood 10 per.?
- (44.) If a railway journey of 177 miles 3 fur. takes 3 hours  $56\frac{1}{2}$  minutes, what is the rate per hour?
- (45.) If I can travel 198 miles by train for £2, 9s. 6d. ought I to be carried for £8, 0s. 10 $\frac{1}{2}$ d.?
- (46.) A race-horse goes 5 miles in 32 minutes; how far will he be going in 1650 yards?
- (47.) What quantity of wine at the rate of £31, 16s. 46 gallons may be got for £117, 11s. 8d.?
- (48.) Find the cost of 5 bins of oats, each containing 7 bus. 3 pecks, at £1, 8s. 8d. per quarter.
- (49.) If a railway train goes 200 miles in 8 hours, in what time will it make a journey of 40 miles?
- (50.) A quantity of provisions would last 378 men for 10 days; how long would the same provisions last 504 men?
- (51.) If 12 bus. of wheat cost £4, 1s. 6d., find price of 10 bus.?
- (52.) If 102 acres of land yield 334 qrs. 5 bus. 2 pecks how much was got from 52 acres?
- (53.) If 1 cwt. 1 qr. 21 lbs. of sugar cost £3, 7s. 1d., what quantity can be got for £29, 15s.?
- (54.) What weight of iron may be bought for £187, if the cost of 6 cwts. 2 qrs. is £27, 14s. 8d.?
- (55.) How long will a journey of 15 miles 24 per. 3 at the rate of " " " 5 fur. 4 per. 3 yds. in 5 miles?

- (56.) It requires 54 yards of printed cloth, 3 qrs. broad, to make the curtains of a bed; how much will it require of a description of cloth 5 qrs. broad?
- (57.) What is the height of an object which casts a shadow of 454 feet 5 inches, when a staff 3 feet 8 inches projects a shadow of 6 feet 10 inches?
- (58.) If I lend a friend £300 for 270 days, how long ought he to accommodate me with £450?
- (59.) How many casks of 40 gallons would hold as much as 32 casks of 25 gallons each?
- (60.) How many men must be employed to do a piece of work in 15 days, which 9 men can do in 35 days?
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EXAMINATION EXERCISES FOR V<sup>1</sup>.

## SET I.

## Exercise 14.

## A1.

- (1.) Find the cost of 3 cwts. 2 qrs. at the rate of 12s. for 36 cwts.
- (2.) From 1,900,909 take 900,959.
- (3.) From 2 qrs. 18 lbs. 12 ozs. take 1 qr. 18 lbs. 15 ozs.
- (4.) Multiply 78 ac. 3 rds. 22 per. by 9.
- (5.) 7,938,732 seconds to days.
- (6.) If 8 eggs cost 10d., how much would 8 dozen cost?

## B1.

- (1.) If 3 cwts. 0 qrs. 15 lbs. cost £4, 14s. 6d., what can I get for 15s. 9d.?
- (2.) Multiply 30,200 by 4200.
- (3.) From 6 mls. 6 fur. 14 per. take 3 mls. 4 fur. 16 pls. 3 yds.
- (4.) Multiply 35 ozs. 12 dwts. 6 grs. by 24.
- (5.) Reduce 11 sq. per. to sq. yards.
- (6.) What will 44 pints cost at the rate of £2, 6s. for 17 gallons.  
1 qt.?

## C1.

- (1.) If 18 men do a piece of work in 30 days, how many men will do it in 60 days?
- (2.) The divisor is 27, and the quotient 5, and the remainder 9;  
*find the dividend.*

- (3.) From £100 take £8, 18s.  $8\frac{1}{2}d$ .
- (4.) Multiply 4 days 23 hrs. 32 min. 45 sec. by 24.
- (5.) 9,364,782 ozs. to cwts.
- (6.) If a package contain  $\frac{1}{2}$  a stone, how often is it contained in 12 cwts. 2 qrs. 7 lbs.?

## D1.

- (1.) What weight can I get for £13, 5s. when 10 lbs. cost £2, 4s. 2d.?
- (2.)  $9025 \times 270$ .
- (3.) From £11, 4s.  $6\frac{1}{2}d$ . take 19s.  $7\frac{1}{2}d$ .
- (4.) Find in ozs. the weight of 15 silver rings when one of them weighs 8 dwts. 4 grs., and each of the rest weighs 9 dwts. 10 grs.
- (5.) Reduce 103,697 feet to miles.
- (6.) If 3 acres cost £2, 16s. 3d., what would 30 acres cost?

## E1.

- (1.) If 2 cwts. 1 qr. cost £1, 7s., what would 50 cwts. cost?
- (2.)  $804 \times 940$ .
- (3.) From 3 acrs. 1 rd. 26 per. take 1 ac. 2 rds. 19 per.
- (4.) Find the cost of 94 lbs. of beef at 6d. per lb. and 90 lbs. of butter at 8d. per lb.
- (5.) How many minutes in a leap year?
- (6.) Find the cost of 2 cwts. 2 stone at the rate of 2s. 10d. for 2 stone.

## F1.

- (1.) If 5 lbs. of tea cost 13s. 4d., what would a chest containing 2 cwts. cost?
- (2.)  $905 \times 890$ .
- (3.) From 8 cwts. 2 qrs. 14 lbs. 8 ozs. take 7 cwts. 2 qrs. 16 lbs. 11 ozs.
- (4.) 15 tons 6 cwts. 3 qrs. 7 lbs.  $\times$  6.
- (5.) How many feet in 13 statute acres?
- (6.) Find the price of 23 yards 2 qrs. at £1, 7s. 6d. for 2 yards.

## G1.

- (1.) If a man walked 60 miles in 61 hrs. 12 min., how long would he be walking 15 miles?
- (2.)  $2011 \times 2030$  (also give your answer in words).
- (3.) How much change would you receive after paying for 10 yards at  $6\frac{1}{2}d$ . a yard out of half-a-sovereign?
- (4.) The quotient is £1, 12s.  $6\frac{1}{4}d$ ., the divisor is 11; find the dividend.

- (5.) Reduce 14 mls. 6 fur. 3 per. 5 yds. 3 in. to inches.  
 (6.) What will 24 yards of cloth cost at the rate of 2s.  $2\frac{1}{2}$ d. for  
 6 yards?

## H1.

- (1.) What weight could I buy for £5, 8s. 4d. at 13s. 4d. per cwt.?  
 (2.)  $17,629,043 \times 2070$ .  
 (3.) From 9 tons 19 cwts. 2 qrs. 15 lbs. take 8 tons 17 cwts.  
 2 qrs. 24 lbs.  
 (4.) 9 hrs. 36 min. 30 sec.  $\times 84$ .  
 (5.) Reduce 12 miles 3 fur. 13 per. to feet.  
 (6.) If a train travels 180 miles in 2 hours, how far will it  
 travel in 20 minutes?

## I1.

- (1.) How many medals each weighing 9 ozs. could be made  
 from 15 lbs. of silver?  
 (2.)  $7,298,432 \div 7202$ .  
 (3.) From 16 lbs. 0 ozs. 14 dwts. 6 grs. take 6 lbs. 3 ozs.  
 19 dwts. 3 grs.  
 (4.) 34 cwts. 2 qrs. 20 lbs.  $\times 75$ .  
 (5.) A purse contains 13 half-sovereigns, 4 crowns, 18 half-  
 crowns, 3 florins, and 15 farthings: how many farthings  
 is the whole money equal to?  
 (6.) A chest of tea costs £6, 10s. The tea is 2s. 6d. a lb.: how  
 many lbs. are there in the chest?

## J1.

- (1.) If 5 lbs. cost £6, 6s., what would be the price of 5 cwts.?  
 (2.) From 1,001,001 take 991,091.  
 (3.) From 2 mls. 2 furs. 4 pers. 2 yards take 1 ml. 6 furs.  
 17 pers. 3 yards.  
 (4.) 12 hours 10 mins. 14 secs.  $\times 46$ .  
 (5.) Reduce 64,209 sq. pers. to acres.  
 (6.) If 5 yards cost 2s. 6d., what will 20 yards cost?

## K1.

- (1.) How many yards could be got for £2, 5s. when 8 yards  
 cost 11s. 3d.?  
 (2.)  $7,298,431 \div 7202$ .  
 (3.) Subtract 8 mls. 7 furs. 17 pers. 3 yards from 9 mls. 6 furs.  
 16 pers. 2 yards.  
 (4.) £252, 18s.  $\times 632$ .  
 (5.) Reduce 17 acs. 2 rds. 13 per. to sq. yards.  
 (6.) If 3 apples cost 1s., how many can I get for £28, 4s. 4d.?

## L1.

- (1.) If 15 cwts. 2 qrs. cost £6, 14s. 4d., what ought 20 cwts. cost?
- (2.)  $17,609,849 \times 7070$ .
- (3.) From £90 take 5 half-guineas, 8 half-crowns, 9 threepences, and 4 guineas.
- (4.) 4 acres. 1 rd. 32 pers.  $\times$  50.
- (5.) Reduce 558 lbs. (Troy) to grains.
- (6.) If 19 yards cost £2, 5s. 9d., find the price of 9 yards 2 qrs.

## M1.

- (1.) If 3 cwts. 1 qr. 20 lbs. cost £9, 12s., what ought 1 cwt. 3 qrs. 5 lbs. cost?
- (2.)  $860 \times 760$ .
- (3.) From 20 cwts. 3 qrs. 20 lbs. 10 ozs. take 19 cwts. 2 qrs. 19 lbs. 15 ozs.
- (4.) 13 cwt. 3 qrs. 26 lbs.  $\times$  76.
- (5.) Reduce 4 furs. 6 pers. 3 yds. to feet.
- (6.) If 13 lbs. 10 ozs. cost 18s. 2d., how much would you get for 11s. 7d.?

## N1.

- (1.) What would be the cost of 147 articles at 7s. 6d. per score?
- (2.)  $5020 \times 5020$ .
- (3.) From 6 miles 0 fur. 19 pers. 3 yards take 3 miles 4 furs. 16 perches 2 yards.
- (4.) £13, 15s. 8d.  $\times$  140.
- (5.) Reduce 563 perches to feet.
- (6.) If 5 yards cost 2s.  $8\frac{1}{2}$ d., what would 25 yards cost?

## O1.

- (1.) If 95 men do a piece of work in 15 days, how many men could do it in 5 days?
- (2.) From 10,980 take 1872.
- (3.) A man had 10 gallons of milk, and gave  $\frac{1}{2}$  pint to each of 30 customers; how many pints had he left?
- (4.) How much money must be divided among 160 persons so that each may receive £32, 18s. 6d.?
- (5.) Reduce 14 tons 1 cwt. 2 qrs. 15 lbs. to lbs.
- (6.) A chest of tea containing 14 lbs. cost £1, 6s. 8d., what would 1 cwt. cost?

## P1.

- (1.) A man earns £292 in 365 days, what is that for 62 days?
- (2.)  $17,629,843 \times 2070$ .

- (1) Out of 1 ton of coal I burn 2 stone per day for 21 days.  
how many stones have I burnt?  
 (2) Find the price of 136 articles at £1 each.  
 (3) Reduce 15 cwt. 3 qr. 2 lbs.  
 (4) If 2 rods cost 17s. 6d., what will 21 acres cost?

## Q1.

- (1) The 1st 3 terms of a proportion are  $\frac{1}{2} : 3 : : 4 : :$  find  
the 4th term.  
 (2)  $72,984,321 \div 7202$ .  
 (3) From £56, 5s. 6d. take £45. 1s. 2d.  
 (4) Find the price of 145 articles at £1. 7s. 6d. each.  
 (5) Reduce 537 lbs. (Troy) to grains.  
 (6) What will 27 dozen eggs cost at 4s. 6d. for 3 dozen?

## P1.

- (1) If 6 lbs. cost 10s., find the cost of 5 lbs.  
 (2) Take 900,939 from 1,940,940.  
 (3) From 1 ton 16 cwt. 3 qr. 0 lbs. take 19 cwt. 1 qr. 19 lbs.  
 (4) £8, 12s. 6d.  $\times$  37.  
 (5) Reduce 8675 sq. yards to acres.  
 (6) If 1 cwt. cost 18s. 4d., what will 1 stone cost?

## S1.

- (1) If 6 yards cost 8s.  $4\frac{1}{2}$ d., what will 72 yards cost?  
 (2)  $8900 \times 240$ .  
 (3) From £1, 1s.  $6\frac{1}{2}$ d. take 19s.  $7\frac{1}{2}$ d.  
 (4) If the divisor is 8 and the quotient £9, 5s. 4d., find the  
dividend.  
 (5) Reduce 25 lbs. (Troy) to grains.  
 (6) If a boy gets 18s. 9d. for 15 days' work, how much will he  
get for 8 days?

## T1.

- (1) If 40 tons be carried for £15, how many tons should be  
carried for £9?  
 (2)  $7,080,943 \times 60,800$ .  
 (3) You buy 36 yards of cloth at 1s.  $2\frac{1}{2}$ d. per yard, what change  
should you get out of £3?  
 (4) £328, 18s. 6d.  $\times$  96.  
 (5) Reduce 2134 aca. to sq. yards.  
 (6) What would 8 yards 1 qr. cost at the rate of £1, 9s. 6d.  
for 3 yards?

## SET II.

## Exercise 15.

## A2.

- (1.) Find in grains the difference between 12 lbs. Avoirdupois and 16 lbs. Troy.
- (2.) Reduce 187,537,086 sq. inches to Irish acres, &c.
- (3.) If 15 men do a piece of work in 9 days, how many men would do it in 5 days?
- (4.) If 2 dozen cost 2s. 2d., find the cost of 6 dozen.
- (5.) If 1 Troy pound cost £1, 19s., find the cost of an Avoirdupois pound.
- (6.) Bought 12½ yards of cloth at 12s. 6d. per yard, what change should I get out of a ten-pound note?

## B2.

- (1.) Give the rule for finding the value of a ratio. Find the value of the ratio 16s. 8d. : 3s. 4d.
- (2.) Reduce 594,638 cubic inches to cubic yards, &c.
- (3.) How many threepences should you get for 7½ half-crowns?
- (4.) 14 acs. 3 roods 17 per. × 32.
- (5.) Find the value of 260 stones of potatoes at 5½ d. per stone.
- (6.) Reduce 1 ml. 2 fur. 5 per. statute measure to inches.

## C2.

- (1.) How much cloth would make 31 suits of clothes at the rate of 6 yds. 2 qrs. 1 nl. for each suit?
- (2.) If 3 lbs. cost 1s. 4d., find the cost of 3 ozs.
- (3.) Reduce 36,295 inches to miles (Irish).
- (4.) Find the difference between 3 cwts. 1 qr. 5 lbs. and 1 cwt. 3 qrs. 23 lbs.
- (5.) What weight of silver could be bought for £13, 15s. at the rate of 13s. 9d. for 2½ ozs.?
- (6.) 5090 × 5090.

## D2.

- (1.) Reduce 862,347 ounces to tons.
- (2.) 89 acres 2 roods 29 per. ÷ 5.
- (3.) How many bags of coal, each containing 1 cwt. 2 qrs., could be filled from a heap containing 7½ tons?
- (4.) From 24 lbs. 6 ozs. 12 dwts. 14 grs. take 20 lbs. 8 ozs. 13 dwts. 19 grs.
- (5.) Find the missing term in the following proportion:—  
12s. 6d. : £7, 10s. :: ? : 12 lbs.
- (6.) If 4 lbs. cost 5s., find the cost of 4 ozs.

## E 2.

- (1.) Express in £ s. d. the difference between 12 half-guineas and 12 half-crowns.
- (2.) 37 acs. 3 rds. 19 per. ÷ 17.
- (3.) How much money will be required to pay 29 men 18s.  $6\frac{1}{2}d.$  each?
- (4.) If an Irish acre cost £3, 5s. 4d., find the cost of an English acre.
- (5.) How often is 6s.  $4\frac{1}{2}d.$  contained in £51?
- (6.) Subtract 6789 from 5,908,241.

## F 2.

- (1.) Take 6 times 3s.  $4\frac{1}{2}d.$  from 40 half-crowns.
- (2.) Find the missing term in the following proportion :—  
15 men : ? :: £150, 10s. : £30, 2s.
- (3.) How often is 4 lbs. contained in 2 cwts. 2 qrs.?
- (4.) Reduce 29,608,735 sq. inches to acres, &c.
- (5.) Express in £ s. d. the amount of money in a purse which contains 5 half-sovereigns, 3 half-crowns, 7 threepences, and 5 halfpence.
- (6.) How many steps will a man take in walking 2 miles 3 furlongs, if each step is 3 feet in length?

## G 2.

- (1.) Find the price of 6 tons 2 cwts. at the rate of 7s. 4d. for 1 cwt.
- (2.) Express in grains the difference between the weight of an ounce of gold and an ounce of feathers.
- (3.) 276 tons 12 cwts. 3 qrs. 27 lbs. ÷ 9.
- (4.) How often could 2s.  $7\frac{1}{2}d.$  be taken out of 10 guineas?
- (5.) If a man saves £15 in 2 years, how long will he be saving £300?
- (6.) Reduce 8 mls. 2 fur. 30 per. statute measure to feet.

## H 2.

- (1.) Reduce 1705 inches to yards.
- (2.) How often could a can containing half a pint be filled out of a 5-gallon cask?
- (3.) Subtract 5 cwts. 3 qrs. 25 lbs. 13 ozs. from 8 cwts. 2 qrs. 21 lbs. 5 ozs.
- (4.) Find the price of 240 articles at 17s. 6d. a gross.
- (5.) If a farm containing 36 acs. 2 rds. 10 per. could be rented for £30, 10s., find the rent of a farm containing 146 acs. 1 rd.

- (a) In a purse there are 12 half-sovereigns, 5 half-crowns, and 9 halfpence. How much £ s. d. in all?

## L 1.

- (1.) Reduce 368,973 sq. feet to Irish acres.  
 (2.) If the railway fare for  $10\frac{1}{2}$  miles were 2s. 7d., how far should you get for £1, 11s.?  
 (3.) 928 acres 1 rd. 32 per. = ?  
 (4.) If the price of 3 cwt. of goods be 3 guineas, find the price of 3 stones.  
 (5.) Find the cost of 1 lb. of tea, if  $2\frac{1}{2}$  ozs. cost  $7\frac{1}{2}$ d.  
 (6.) How much sugar at  $2\frac{1}{2}$ d. per lb. should be got in exchange for 5 lbs. of tea at 2s. 6d. a lb.?

## L 2.

- (1.) By how much is a rope 30 yards in length greater than one 13 yds. 8 ft. 3 ins.?  
 (2.) How many times does a carriage wheel 12 feet in circumference revolve in a distance of  $1\frac{1}{2}$  miles?  
 (3.) From £1, 19s.  $7\frac{1}{2}$ d. take 18s. 6d.  
 (4.) If one spoon weighs 3 ozs. 3 dwts. 12 grs., find the weight of 1 dozen spoons.  
 (5.) £39s. 17s. 6d.  $\times$  13d.  
 (6.) If 1 cwt. cost £3. 1s. 4d., find the price of 3 stones.

## L 3.

- (1.) Find the number of seconds in February (Leap year).  
 (2.) If 15 men can build a house in 30 days, how many men would do it in 30 days?  
 (3.) 3 tons 13 cwt. 2 qrs. 5 lbs.  $\times$  24.  
 (4.) If 1 $\frac{1}{2}$  lbs. of tea cost £1, 10s., how much could be got for £30?  
 (5.) Reduce 2 mils. 3 fur. 12 per. 2 yds. 1 ft. 6 in. to inches.  
 (6.) Find the number of grains in  $29\frac{1}{2}$  lbs. Avoirdupois.

## L 2.

- (1.) How much tea can be bought for £9, 15s., when 5 $\frac{1}{2}$  lbs cost 14s. 8d.?  
 (2.) If 15 sheep eat 19s. 4d. worth of food in a certain time, how much will maintain 35 sheep for the same time?  
 (3.) £84, 15s.  $9\frac{1}{2}$ d.  $\div$  16 $\frac{2}{3}$ .  
 (4.) Find the difference in £ s. d. between 16 half-guineas and 40 half-crowns.  
 (5.) If 3 cwt. of goods cost 8 guineas, find the cost of  $7\frac{1}{2}$  stones.  
 (6.) 14 aca. 3 rds. 24 per.  $\div$  36.

## M 2.

- If 2 yds. of cloth cost 3s. 4d., find the cost of 16 yds.  
 How much land at £2, 7s. per ac. should be given in exchange for 1222 acres at 10s. per ac.?  
 13 acs. 2 rds. 10 per.  $\times$  65.  
 How many shirts, each containing 3 yds. 2 qrs. 1 nl., could be made from a piece of linen containing 71 yds. 1 qr.?  
 If 1 ac. cost £2, 15s., find the cost of 34 acs.  
 Reduce 1 dy. 1 hr. 1 min. 1 sec. to secs.

## N 2.

- 8060  $\times$  5070.  
 Reduce 8360 perches to acres.  
 Find the value of the following in £ s. d.:—3 guineas + 5 half-guineas + 7 half-crowns + 18 sixpences + 19 half-pence.  
 £14, 15s. 7½d.  $\times$  89.  
 If 2 lbs. cost 15s. 8d., find the cost of 4 cwts.  
 13 cwts. 2 qrs. 13 lbs.  $\times$  74.

## O 2.

- From 27 cwts. 1 qr. 2 lbs. take 21 cwts. 3 qrs. 19 lbs.  
 £839, 13s. 8½d.  $\div$  15.  
 How many florins could be taken out of 860 half-crowns?  
 How many half-pound packages could be made out of 3 cwts. 2 qrs. 2 lbs. of tea?  
 If 3 cwts. 2 qrs. of goods cost £6, 10s. 8d., find what quantity could be got for £32, 13s. 4d.  
 A gentleman's annual income is £500, find his yearly saving if he spends £4, 10s. per week.

## P 2.

- ) Subtract 13 acs. 2 rds. 19 per. from 47 acs. 1 rd. 1 per.  
 ) How many oranges at 10½d. a dozen could be purchased for £4, 7s. 6d.?  
 ) How many yards of cloth at 5s. 3d. per yard could be purchased for 27 guineas?  
 ) How often is  $\frac{1}{2}$  a stone contained in 5 tons 13 cwts. 2 qrs.?  
 ) 15 acs. 2 rds. 10 per.  $\times$  35.  
 ) 60,907  $\times$  8090.

## Q 2.

- ) 16 acs. 3 rds. 19 per. + 21 acs. 2 rds. 21 per. + 5 acs. 1 rd. 3 per. + 29 acs. 1 rd. 15 per. + 190 acs. 0 rds. 3 per.

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< 475.

cows eat 13 tons 2 cwts. 2 qrs. of hay in a certain time, how many tons, &c., would 700 cows eat in the same time?

often is  $\frac{1}{2}$  stone contained in 5 tons 3 cwts.?

### V 2.

often is 3 pints contained in 27 gallons?

ozs. cost 2s. 6d., find the cost of  $2\frac{1}{2}$  lbs.  
 $13s. 9\frac{1}{2}d. \div 15\frac{5}{6}$ .

13 cwts. 2 qrs. 13 lbs.  $\times 11$ .

many spoons, each weighing 3 ozs. 13 dwts. 16 grs., could be made out of 14 lbs. 8 ozs. 16 dwts.?

stone 3 lbs. of sugar cost 5s. 2d., find the price of wts. 2 qrs.

### W 2.

men earn £16, 10s. in a certain time, how much will men earn in the same time?

many threepences could be got for  $5\frac{1}{2}$  guineas?  
 $ce 18$  lbs. 3 ozs. 15 dwts. to grains.

the difference in grains between 8 lbs. Av. and 9 lbs. y.

, 15, and 90 find a fourth proportional.

the number of seconds in the month of January.

### X 2.

many revolutions would a wheel 24 feet in circumference make in a mile?

many suits, each requiring 5 yds. 3 qrs., could be made out of 115 yds.?

a piece of cloth 315 yds. long a piece 30 yds. 3 qrs. ails was cut off; how much remained?

an eighty-gallon cask how many 5-noggin bottles could be filled.

ce 396274 inches to Irish miles.

2 rds. 13 per.  $\times 165$ .

### Y 2.

ht 8 lbs. of tea at 2s.  $7\frac{1}{2}d.$  a lb., how much change could I get out of a guinea?

horses plough 12 acs. 2 rds. 10 per., how many acres could 32 horses plough?

ce 326,943 cubic inches to cubic yards

many plots of 1 ac. 3 rds. 10 per. could be made out of a farm containing 68 ac. 3 rds. 20 per.?

)

c

#### **THE JOURNAL OF APPLIED AERONAUTICS**

and the other two were composed of

5

1. A man has a balance of \$5.  
2. He wants to buy a watch between \$1.00 or less and  
3. \$1.50. How many choices does he have?  
4. If a book costs \$1.25, how much is the price of  
5. 10 books?  
6. If a man wants to buy a coat for \$10.00, how many ways could he  
7. pay for it?  
8. If a man has a balance of \$10.00, how much  
9. can he spend if the rate of 4% for 60 days  
10. is charged on his balance?

#### REFERENCES

is called a fraction. The number above the line is called the Numerator, and the number below the line is called the Denominator. The denominator shows how many equal parts there are in the whole. For example, if a whole is divided into six equal parts, each part is called a sixth of the whole. If a whole is divided into three equal parts, each part is called a third of the whole, and so on.

The fraction is the ratio or relation of two numbers written one above the other, and separated by a line between them; as  $\frac{1}{2}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$ , etc. The number above the line is called the number of parts into which the whole is divided, and the number above the line is called the number of parts taken. The upper number is called the Numerator, and the lower number is called the Denominator. The denominator always divides the numerator and the denominator always divides into the numerator.

o The value of the variable  $x$  whose denominator is less than its numerator.

DEFINITION 1. ONE WHICH DENOMINATOR IS EITHER  
ONE, OR SIMPLY AS  $\frac{1}{2}$ .

1. The numbers 1, 2, 3, 4, are called *Integers*. An Integer can be expressed in several forms by placing the integer as numerator in a fraction, as 7.

... and a fraction, as  $8\frac{1}{2}$ .

## GREATEST COMMON MEASURE.

A Product is the result of the multiplication of two or more numbers together. These numbers are called the Factors of the Product.

MEASURE is only another name for FACTOR.

One number is said to be the MEASURE of another when it is contained in that other an exact number of times.

A COMMON MEASURE is a number which measures two or more others: thus 2 is a common measure of 4 and 8.

The GREATEST COMMON MEASURE is the *greatest* number which measures two or more given numbers: thus 6 is the G.C.M. of 12, 18, and 24.

To find the G.C.M. of two numbers.

Rule:—Divide the greater number by the less; then divide the remainder, if any, into the preceding divisor. Continue the process of dividing each remainder into the preceding divisor until nothing remains. The last divisor will be the G.C.M.

Example:—Find the G.C.M. of 384 and 796.

$$\begin{array}{r}
 & 2 \\
 384 ) & 796 \\
 & 768 \quad 13 \\
 \hline
 & 28 ) 384 \\
 & \quad 28 \\
 & \hline
 & 104 \\
 & 84 \quad 1 \\
 \hline
 & 20 ) 28 \\
 & \quad 20 \\
 & \hline
 & 8 ) 20 \\
 & \quad 16 \quad 2 \\
 & \hline
 & 4 ) 8 \\
 & \quad 8 \\
 & \hline
 \end{array}$$

*Ans.* G.C.M. = 4.

To find the G.C.M. of more than two numbers.

Rule:—Find the G.C.M. of the first two of them; then find the G.C.M. of the result and the third number, and so on to the last. The last result will be the G.C.M. of all the numbers.

Numbers are said to be *prime* to one another when their G.C.M. is unity.

A *prime number* is one which cannot be resolved into factors *other than itself and unity*.

Exercise 16.

Find the G.C.M. of the following.—

- |       |                |       |                      |
|-------|----------------|-------|----------------------|
| (1.)  | 4 and 8.       | (11.) | 24 and 18.           |
| (2.)  | 3 and 5.       | (12.) | 25 and 20.           |
| (3.)  | 7 and 2.       | (13.) | 48 and 64.           |
| (4.)  | 12 and 18.     | (14.) | 125 and 25.          |
| (5.)  | 17 and 14.     | (15.) | 150 and 30.          |
| (6.)  | 19 and 23.     | (16.) | 75 and 105.          |
| (7.)  | 36 and 42.     | (17.) | 100 and 100.         |
| (8.)  | 25 and 7.      | (18.) | 13615 and 36500.     |
| (9.)  | 120 and 48.    | (19.) | 15602 and 28730.     |
| (10.) | 112 and 46.    | (20.) | 1698 and 3136.       |
| (11.) | 216 and 112.   | (21.) | 47348 and 120408.    |
| (12.) | 35 and 105.    | (22.) | 127444 and 106338.   |
| (13.) | 1155 and 165.  | (23.) | 1287408 and 1086748. |
| (14.) | 375 and 455.   | (24.) | 14, 278, and 476.    |
| (15.) | 1104 and 2172. | (25.) | 22, 352, and 1372.   |

VULGAR FRACTIONS.—REDUCTION.

To Reduce a fraction to its lowest terms.

Rule.—Divide its terms by their G.C.M.

Note.—The value of a fraction is unaltered when its terms are multiplied or divided by the same number.

Example.—Reduce  $\frac{4}{12}$  to its lowest terms.

G.C.M. = 4.

\therefore \frac{4}{12} = \frac{1}{3}.

Exercise 17.

Reduce the following fractions to their lowest terms.—

- |      |   |       |   |       |   |       |                   |
|------|---|-------|---|-------|---|-------|-------------------|
| (1.) | $\frac{23}{25}$ .   | (9.)  | $\frac{11}{12} \frac{1}{2}$ .                                   | (17.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4}$ .               | (25.) | $\frac{1}{100}$ . |
| (2.) | $\frac{2}{25}$ .  | (10.) | $\frac{1}{12} \frac{1}{3}$ .                                    | (18.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4}$ .               | (26.) | $\frac{1}{120}$ . |
| (3.) | $\frac{4}{23} \frac{1}{15}$ .   | (11.) | $\frac{1}{2} \frac{1}{3} \frac{1}{2}$ .                         | (19.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4}$ .               | (27.) | $\frac{1}{120}$ . |
| (4.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4}$ .                                     | (12.) | $\frac{1}{2} \frac{1}{3} \frac{1}{2}$ .                         | (20.) | $\frac{1}{12} \frac{1}{3} \frac{1}{4}$ .              | (28.) | $\frac{1}{120}$ . |
| (5.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5}$ .                         | (13.) | $\frac{1}{12} \frac{1}{3} \frac{1}{4} \frac{1}{5}$ .            | (21.) | $\frac{1}{120} \frac{1}{5}$ .                         | (29.) | $\frac{1}{120}$ . |
| (6.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6}$ .             | (14.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5}$ .             | (22.) | $\frac{1}{120} \frac{1}{5} \frac{1}{6}$ .             | (30.) | $\frac{1}{120}$ . |
| (7.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6} \frac{1}{7}$ . | (15.) | $\frac{1}{2} \frac{1}{3} \frac{1}{4} \frac{1}{5} \frac{1}{6}$ . | (23.) | $\frac{1}{120} \frac{1}{5} \frac{1}{6} \frac{1}{7}$ . |       |                   |
| Ans. | $\frac{1}{120} \frac{1}{5} \frac{1}{6} \frac{1}{7}$ .                       | (16.) | $\frac{1}{120} \frac{1}{5} \frac{1}{6} \frac{1}{7}$ .           |       |   |       |                   |

To reduce a mixed number to an Improper Fraction.

Rule:—Multiply the whole number by the denominator of the fraction, and add the numerator to the product. Under this result write the denominator of the fraction.

Example:—Reduce  $5\frac{7}{8}$  to an improper fraction.

$$\begin{array}{r} 5\frac{7}{8} \\ \times 8 \\ \hline 47 \end{array} \qquad \text{Ans. } \frac{47}{8}.$$

### Exercise 18.

Reduce the following mixed numbers to improper fractions:—

- |                                   |                          |                                   |                            |
|-----------------------------------|--------------------------|-----------------------------------|----------------------------|
| (1.) $7\frac{1}{2}$ .             | (6.) $15\frac{5}{6}$ .   | (11.) $4\frac{7}{11}$ .           | (16.) $10\frac{2}{5}$ .    |
| (2.) $8\frac{9}{10}$ .            | (7.) $19\frac{1}{4}$ .   | (12.) $8\frac{1}{2}\frac{1}{2}$ . | (17.) $23\frac{6}{19}$ .   |
| (3.) $10\frac{1}{2}\frac{1}{2}$ . | (8.) $28\frac{3}{10}$ .  | (13.) $10\frac{1}{5}$ .           | (18.) $21\frac{5}{14}$ .   |
| (4.) $12\frac{2}{3}$ .            | (9.) $30\frac{1}{12}$ .  | (14.) $15\frac{4}{27}$ .          | (19.) $84\frac{3}{25}$ .   |
| (5.) $20\frac{5}{11}$ .           | (10.) $40\frac{1}{20}$ . | (15.) $20\frac{9}{35}$ .          | (20.) $114\frac{21}{44}$ . |

To reduce an Improper Fraction to a mixed number.

Rule:—Divide the numerator by the denominator.

Example:— $\frac{47}{8} = 5\frac{7}{8}$ .

### Exercise 19.

Reduce the following improper fractions to mixed numbers:—

- |                         |                          |                          |                          |
|-------------------------|--------------------------|--------------------------|--------------------------|
| (1.) $\frac{15}{4}$ .   | (6.) $\frac{58}{8}$ .    | (11.) $\frac{41}{9}$ .   | (16.) $\frac{442}{2}$ .  |
| (2.) $\frac{19}{8}$ .   | (7.) $\frac{75}{10}$ .   | (12.) $\frac{311}{12}$ . | (17.) $\frac{758}{18}$ . |
| (3.) $\frac{25}{5}$ .   | (8.) $\frac{91}{9}$ .    | (13.) $\frac{480}{11}$ . | (18.) $\frac{75}{22}$ .  |
| (4.) $\frac{40}{7}$ .   | (9.) $\frac{57}{7}$ .    | (14.) $\frac{326}{13}$ . | (19.) $\frac{228}{28}$ . |
| (5.) $\frac{100}{12}$ . | (10.) $\frac{600}{60}$ . | (15.) $\frac{223}{15}$ . | (20.) $\frac{302}{11}$ . |

To reduce any quantity to the fraction of another quantity of the same kind.

Rule:—(1) Write the first quantity as numerator, and the second as denominator.

(2) Reduce the quantities down to the lowest denomination in either, and then reduce the fraction so formed to its lowest terms.

Example:—Reduce  $4\frac{1}{2}d.$  to the fraction of  $4s. 6d.$

$$\frac{4\frac{1}{2}d.}{4s. 6d.} = \frac{9}{108} = \frac{1}{12}. \text{ Ans.}$$

## Exercise 16.

Find the G.C.M. of the following:—

- |                      |                            |
|----------------------|----------------------------|
| (1.) 14 and 28.      | (16.) 3471 and 1869.       |
| (2.) 15 and 35.      | (17.) 225 and 270.         |
| (3.) 42 and 12.      | (18.) 432 and 648.         |
| (4.) 38 and 16.      | (19.) 135 and 215.         |
| (5.) 17 and 44.      | (20.) 182 and 364.         |
| (6.) 39 and 26.      | (21.) 756 and 1575.        |
| (7.) 56 and 80.      | (22.) 1008 and 1036.       |
| (8.) 28 and 70.      | (23.) 13618 and 38830.     |
| (9.) 120 and 48.     | (24.) 15602 and 28797.     |
| (10.) 110 and 66.    | (25.) 5898 and 3126.       |
| (11.) 216 and 316.   | (26.) 47346 and 120406.    |
| (12.) 39 and 192.    | (27.) 437414 and 1053538.  |
| (13.) 1155 and 352.  | (28.) 5397406 and 1090745. |
| (14.) 376 and 1645.  | (29.) 84, 1278, and 476.   |
| (15.) 1134 and 2079. | (30.) 88, 132, and 1374.   |

## VULGAR FRACTIONS.—REDUCTION.

To Reduce a fraction to its lowest terms.

Rule:—Divide its terms by their G.C.M.

Note.—The value of a fraction is unaltered when its terms are multiplied or divided by the same number.

Example:—Reduce  $\frac{4}{12}$  to its lowest terms.

$$\text{G.C.M.} = 8.$$

$$\therefore \frac{4}{12} = \frac{1}{3}.$$

## Exercise 17.

Reduce the following fractions to their lowest terms:—

- |                            |                             |                             |                           |
|----------------------------|-----------------------------|-----------------------------|---------------------------|
| (1.) $\frac{32}{256}$ .    | (9.) $\frac{8168}{1536}$ .  | (17.) $\frac{6280}{1240}$ . | (24.) $\frac{111}{111}$ . |
| (2.) $\frac{28}{188}$ .    | (10.) $\frac{1056}{1384}$ . | (18.) $\frac{176}{224}$ .   | (25.) $\frac{24}{24}$ .   |
| (3.) $\frac{430}{2350}$ .  | (11.) $\frac{4848}{5456}$ . | (19.) $\frac{5510}{6120}$ . | (26.) $\frac{54}{54}$ .   |
| (4.) $\frac{1344}{1336}$ . | (12.) $\frac{2416}{3128}$ . | (20.) $\frac{168}{224}$ .   | (27.) $\frac{32}{32}$ .   |
| (5.) $\frac{1816}{2016}$ . | (13.) $\frac{1824}{1984}$ . | (21.) $\frac{16}{20}$ .     | (28.) $\frac{16}{16}$ .   |
| (6.) $\frac{3068}{3188}$ . | (14.) $\frac{19}{23}$ .     | (22.) $\frac{16}{20}$ .     |                           |
| (7.) $\frac{1968}{1752}$ . |                             | (23.) $\frac{16}{20}$ .     |                           |
| (8.) $\frac{1309}{1787}$ . |                             | (24.) $\frac{16}{20}$ .     |                           |

## Exercise 20.

Reduce—

- (1.) 1s. 3d., 3s. 4d., 7s. 6d., 15s., 1s. 8d., 1s. 6d., 3s. 9d., 10s. 6d., 14s. 8d., and 18s. 4d. to fractions of £1.
- (2.) 2d., 4d., 9d., 3d.,  $1\frac{1}{2}$ d.,  $8\frac{1}{2}$ d.,  $7\frac{1}{4}$ d.,  $6\frac{3}{4}$ d.,  $4\frac{1}{2}$ d., and  $10\frac{1}{2}$ d. to fractions of 1 shilling.
- (3.) 2s. 6d., 3s. 9d., 17s. 6d., 4s.  $10\frac{1}{2}$ d., 18s. 4d., 5s.  $8\frac{1}{2}$ d., and 6s.  $9\frac{1}{2}$ d. to fractions of £1.
- (4.) 1 qr. 21 lbs. to the fraction of  $2\frac{1}{2}$  cwts.
- (5.) 2 hours 15 minutes to the fraction of a day.
- (6.) 3 $\frac{1}{2}$  stones to the fraction of 4 tons 15 cwts.
- (7.)  $1\frac{2}{3}$  yard to the fraction of  $2\frac{1}{2}$  miles.
- (8.) 2s. 6d., 12s. 6d., 10s., 17s., 2s. 4d., 5s. 3d., 9s. 4d., 8s. 5d., 9s. 9d., 12s. 3d., and 16s. 3d. to fractions of £1.
- (9.) 4d., 3d., 8d.,  $1\frac{1}{2}$ d.,  $6\frac{1}{2}$ d.,  $7\frac{1}{4}$ d.,  $8\frac{1}{2}$ d.,  $5\frac{1}{2}$ d., and  $2\frac{1}{4}$ d. to fractions of 1s.
- (10.) 3s. 6d., 4s. 8d., 12s. 6d., 5s.  $8\frac{1}{2}$ d., 19s.  $6\frac{1}{2}$ d., 3s.  $8\frac{3}{4}$ d., 4s.  $7\frac{1}{4}$ d., 4s.  $8\frac{1}{2}$ d. to fractions of £1.
- (11.) 2 qrs. 7 lbs. to the fraction of  $3\frac{1}{2}$  cwts.
- (12.) 3 hours 25 minutes to the fraction of 2 days.
- (13.) 2 $\frac{1}{2}$  stones to the fraction of 3 tons 12 cwts.
- (14.)  $2\frac{3}{4}$  yards to the fraction of  $1\frac{2}{3}$  miles.
- (15.) What fraction of half a sovereign is 1s. 8d.?
- (16.) Reduce 5 fur. to the fraction of 1 mile.
- (17.) Reduce  $10\frac{1}{2}$  poles to the fraction of an acre.
- (18.) What fraction of a year is 18 weeks?
- (19.) Reduce 3 pecks to the fraction of a bushel.
- (20.) Reduce 14 cwts. 3 qrs. 7 lbs. to the fraction of a ton.
- (21.) Reduce 5 fur. 18 poles to the fraction of a mile.
- (22.) Reduce 16 hrs. 40 mins. 40 secs. to the fraction of a day.
- (23.) Reduce 19s.  $4\frac{1}{2}$ d. to the fraction of a £1.
- (24.) What fraction of 1 cwt. is 2 qrs. 7 lbs.?

To find the value of a Fraction of a given denomination.

Rule:—Multiply the number expressing the given denomination by the numerator of the Fraction, and divide by the denominator.

Example:—Find the value of  $\frac{1}{5}$  of £3, 7s. 6d.

$$\begin{array}{r}
 \text{£}3 \quad 7 \quad 6 \\
 \qquad \qquad \qquad 4 \\
 5 ) 13 \quad 10 \quad 0 \\
 \underline{-} \quad \underline{\underline{5}} \quad \underline{\underline{20}} \\
 \qquad \qquad \qquad 0
 \end{array}
 \qquad \qquad \qquad \text{Ans. £}2, 14s.$$

Exercise 2.

Find the value of—

- (1.)  $\frac{1}{2}$  of £1.  
 (2.)  $\frac{1}{2}$  of 7s. 6d.  
 (3.)  $\frac{1}{2}$  of 1 guinea.  
 (4.)  $\frac{1}{2}$  of £3, 6s. 8d.  
 (5.)  $\frac{1}{2}$  of 1½ lb.  
 (6.)  $\frac{1}{2}$  of a week.  
 (7.)  $\frac{1}{2}$  of 3 stones.  
 (8.)  $\frac{1}{2}$  of a ton.  
 (9.)  $\frac{1}{2}$  of 4½ cwt.  
 (10.)  $\frac{1}{2}$  of an acre.  
 (11.)  $\frac{1}{2}$  of a day.  
 (12.)  $\frac{1}{2}$  of a sq. mile.  
 (13.)  $\frac{1}{2}$  of 4 poles.  
 (14.)  $\frac{1}{2}$  of 4 sq. poles.  
 (15.)  $\frac{1}{2}$  of a yard.  
 (16.)  $\frac{1}{2}$  of a sq. yard.  
 (17.)  $\frac{1}{2}$  of 1 mile 3 fur. 15 yds.  
 (18.)  $\frac{1}{2}$  of 3 acres 3 ro. 15 perches.  
 (19.)  $\frac{1}{2}$  of 2 cwt. 14 lbs.  
 (20.)  $\frac{1}{2}$  of 3½ tons.  
 (21.)  $\frac{1}{2}$  of 2 tons 3 cwt. 1 stone.  
 (22.)  $\frac{1}{2}$  of 3 miles 7 fur. 2½ yds.  
 (23.)  $\frac{1}{2}$  of 11 lbs. 14 ozs. 16 drs.  
 (24.)  $\frac{1}{2}$  of £1.  
 (25.)  $\frac{1}{2}$  of 17s. 6d.
- (26.)  $\frac{1}{2}$  of 12 min. 2 sec.  
 (27.)  $\frac{1}{2}$  of 2 hr. 20 min.  
 (28.)  $\frac{1}{2}$  of 2 hrs.  
 (29.)  $\frac{1}{2}$  of 2 hr. 20 min.  
 (30.)  $\frac{1}{2}$  of 2 hr. 20 min.  
 (31.)  $\frac{1}{2}$  of 2 min. 2 sec. 12 yrs.  
 (32.)  $\frac{1}{2}$  of 2 yrs. 2 mos. 16 days.  
 (33.)  $\frac{1}{2}$  of 2 days 16 hrs.  
 (34.)  $\frac{1}{2}$  of 2½ yrs.  
 (35.)  $\frac{1}{2}$  of 1 mi. 17 cwt. 2 oz.  
 (36.)  $\frac{1}{2}$  of 4 miles 2 fur. 11 yds.  
 (37.)  $\frac{1}{2}$  of 8 lbs. 10 ozs. 11 drs.  
 (38.)  $\frac{1}{2}$  of 5½ lbs.  
 (39.)  $\frac{1}{2}$  of 8 tons 12 cwt. 2 oz.  
 (40.)  $\frac{1}{2}$  of 2 miles 4 fur. 33 yds.  
 (41.)  $\frac{1}{2}$  of 16 lbs. 12 ozs. 12 drs.

**LEAST COMMON MULTIPLE**

One number is said to be the **MULTIPLE** of another when it contains that other an exact number of times: thus 10 is a Multiple of 5.

One number is said to be the **COMMON MULTIPLE** of two or more others when it contains each of them an exact number of times: thus 36 is a Common Multiple of 2, 3, 6, and 9.

The **LEAST COMMON MULTIPLE** of two or more numbers is the least number which contains all of them separately an exact number of times: thus 18 is the L.C.M. of 2, 3, 6, and 9.

To find the L.C.M. of two or more numbers:

- Rule. (1) Write the numbers in a horizontal line and separate them by commas.  
 (2) Strike out all those numbers which are factors of the others in this line.  
 (3) Divide across by the factor that will measure most of the remaining numbers, and write the quotients and the undivided numbers on the line below.  
 (4) Proceed with this line as in (2) and (3), and continue these operations with each successive line until no two numbers in the line have a common factor. Then multiply all the divisors and all the numbers in the last line together, and the product will be the L.C.M.

Example. Find the L.C.M. of 18, 15, 14, 28, 35.

$$\begin{array}{r} \text{5) } 18, 15, 14, 28, 35 \\ \text{3) } 18, \quad 5, \quad 14, \quad 28, \quad 35 \\ \text{2) } \quad 6, \quad \quad 14, \quad 28, \quad 35 \\ \text{1) } \quad \quad 6, \quad \quad 7, \quad 14, \quad 35 \end{array}$$

$$\text{L.C.M.} = 5 \times 2 \times 9 \times 14 = 1260. \text{ Ans.}$$

### Exercise 22.

Find the L.C.M. of the following:—

- |                            |                                       |
|----------------------------|---------------------------------------|
| (1.) 4, 6, 8, and 2.       | (16.) 84, 100, and 224.               |
| (2.) 6, 8, 6, and 15.      | (17.) 16, 20, 48, and 72.             |
| (3.) 8, 24, 12, and 3.     | (18.) 5, 10, 15, and 20.              |
| (4.) 2, 7, 4, and 28.      | (19.) 10, 15, 24, and 30.             |
| (5.) 6, 12, 6, and 3.      | (20.) 8, 12, 18, and 24.              |
| (6.) 6, 3, 4, and 8.       | (21.) 6, 9, 12, and 15.               |
| (7.) 6, 9, 27, and 3.      | (22.) 15, 36, and 60.                 |
| (8.) 4, 10, 8, 8, and 25.  | (23.) 12, 14, 20, and 24.             |
| (9.) 8, 4, 6, 6, and 10.   | (24.) 8, 9, 16, 24, and 27.           |
| (10.) 2, 3, 4, 6, and 6.   | (25.) 7, 8, 15, 24, and 21.           |
| (11.) 3, 6, 9, 10, and 15. | (26.) 24, 18, 50, 27, and 25.         |
| (12.) 9, 10, 11, and 30.   | (27.) 11, 42, 14, 33, and 6.          |
| (13.) 12, 15, and 42.      | (28.) 76, 38, 19, 4, and 11.          |
| (14.) 21, 35, and 56.      | (29.) 21, 22, 24, 26, 28, and 30.     |
| (15.) 16, 40, and 96.      | (30.) 30, 32, 34, 35, 36, 37, and 42. |

## VULGAR FRACTIONS.—REDUCTION.

To reduce fractions with *different* denominators to equivalent fractions having a *common* denominator.

Rule:—(1) Find the L.C.M. of the denominators, and this result will be the *common* denominator required.

(2) Divide the common denominator by each of the denominators, and multiply the quotients by the corresponding numerators: the several products will form the new numerators.

Example. Reduce  $\frac{3}{4}$ ,  $\frac{4}{9}$ , and  $\frac{7}{18}$  to equivalent fractions having a common denominator.

L.C.M. of 4, 9, and 18 = 36.

$$\therefore \frac{3}{4} = \frac{27}{36}$$

$$\frac{4}{9} = \frac{16}{36}$$

$$\frac{7}{18} = \frac{14}{36}.$$

*Ans.*  $\frac{27}{36}$ ,  $\frac{16}{36}$ ,  $\frac{14}{36}$ .

## Exercise 23.

Reduce the following to equivalent fractions having a common denominator:—

- |   |  |
|---|--|
| (1.) $\frac{1}{2}$ , $\frac{3}{5}$ , and $\frac{4}{3}$ .                      | (12.) $\frac{7}{8}$ , $\frac{5}{12}$ , $\frac{13}{18}$ , and $\frac{29}{60}$ . |
| (2.) $\frac{1}{3}$ , $\frac{5}{6}$ , and $\frac{7}{12}$ .                     | (13.) $\frac{5}{2}$ , $\frac{3}{8}$ , and $\frac{7}{8}$ .                      |
| (3.) $\frac{7}{10}$ , $\frac{5}{4}$ , and $\frac{5}{6}$ .                     | (14.) $\frac{5}{9}$ , $\frac{7}{18}$ , and $\frac{4}{27}$ .                    |
| (4.) $\frac{1}{4}$ , $\frac{5}{6}$ , and $\frac{1}{2}$ .                      | (15.) $\frac{1}{15}$ , $\frac{1}{5}$ , and $\frac{3}{10}$ .                    |
| (5.) $\frac{3}{4}$ , $\frac{7}{10}$ , and $\frac{4}{5}$ .                     | (16.) $\frac{4}{3}$ , $\frac{1}{7}$ , $\frac{5}{4}$ , and $\frac{5}{1}$ .      |
| (6.) $\frac{5}{9}$ , $\frac{6}{7}$ , and $\frac{2}{3}$ .                      | (17.) $\frac{7}{5}$ , $\frac{3}{12}$ , $\frac{5}{4}$ , and $\frac{39}{60}$ .   |
| (7.) $\frac{3}{2}$ , $\frac{2}{3}$ , and $\frac{7}{9}$ .                      | (18.) $\frac{1}{5}$ , $\frac{1}{25}$ , $\frac{1}{10}$ , and $\frac{17}{60}$ .  |
| (8.) $\frac{5}{4}$ , $\frac{3}{14}$ , and $\frac{10}{21}$ .                   | (19.) $\frac{2}{3}$ , $\frac{1}{15}$ , $\frac{9}{15}$ , and $\frac{5}{4}$ .    |
| (9.) $\frac{13}{20}$ , $\frac{7}{15}$ , and $\frac{2}{3}$ .                   | (20.) $\frac{6}{5}$ , $\frac{8}{12}$ , $\frac{5}{4}$ , and $\frac{19}{60}$ .   |
| (10.) $\frac{2}{3}$ , $\frac{4}{15}$ , $\frac{25}{28}$ , and $\frac{4}{35}$ . | (21.) $\frac{4}{15}$ , $\frac{5}{65}$ , $\frac{7}{12}$ , and $\frac{13}{60}$ . |
| (11.) $\frac{6}{5}$ , $\frac{7}{15}$ , $\frac{5}{24}$ , and $\frac{37}{60}$ . |  |
- (22.) Write down the *greatest* and *least* of the fractions,  $\frac{1}{2}$ ,  $\frac{3}{8}$ , and  $\frac{4}{5}$ .
- (23.) Write down the *greatest* and *least* of the following:—  
 $\frac{3}{2}$ ,  $\frac{7}{12}$ ,  $\frac{8}{5}$ , and  $\frac{4}{3}$ .
- (24.) Write down the *greatest* and *least* of the following:—  
 $\frac{3}{4}$ ,  $\frac{5}{6}$ ,  $\frac{6}{5}$ , and  $\frac{4}{5}$ .

## VULGAR FRACTIONS.—ADDITION.

Rules:—(1) When the fractions have a common denominator, add the numerators together, and under the write the common denominator. If this result is an improper fraction, reduce it to a mixed number.

Example 1. Add together  $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}$ .

$$\frac{2}{7} + \frac{3}{7} + \frac{4}{7} = \frac{9}{7} = 1\frac{2}{7} \text{ Ans.}$$

(2) When the fractions have not a common denominator, reduce them to equivalent fractions having a common denominator; then add the numerators as in (1).

Example 2. Add together  $\frac{3}{4}, \frac{5}{12}, \frac{7}{10}$ , and  $\frac{1}{6}$ .

$$\left. \begin{array}{l} \frac{3}{4} = \frac{45}{60} \\ \frac{5}{12} = \frac{25}{60} \\ \frac{7}{10} = \frac{42}{60} \\ \frac{1}{6} = \frac{10}{60} \end{array} \right\} \text{L.C.D.} = 60.$$

$$\frac{122}{60} = 2\frac{1}{30} \text{ Ans.}$$

(3) When mixed numbers are to be added, first add fractions together, and then to this result add whole numbers.

N.B.—The answer should always be given with the fraction in its lowest terms.

## Exercise 24.

Add together—

- |   |   |
|---|---|
| (1.) $\frac{1}{5} + \frac{3}{5} + \frac{5}{5}$ .                  | (15.) $6\frac{8}{5} + 9\frac{9}{10} + 12\frac{1}{11}$ .           |
| (2.) $\frac{1}{12} + \frac{3}{8} + \frac{1}{3} + \frac{4}{5}$ .   | (16.) $\frac{1}{5} + \frac{2}{3} + \frac{5}{6}$ .                 |
| (3.) $\frac{3}{2} + \frac{5}{9} + \frac{2}{3} + \frac{7}{20}$ .   | (17.) $1\frac{1}{11} + \frac{7}{10} + \frac{2}{3}$ .              |
| (4.) $\frac{1}{5} + \frac{5}{8} + \frac{4}{3} + \frac{1}{2}$ .    | (18.) $\frac{1}{4} + \frac{1}{2} + \frac{3}{4} + \frac{5}{8}$ .   |
| (5.) $\frac{3}{4} + \frac{5}{6} + \frac{7}{8}$ .                  | (19.) $\frac{2}{3} + \frac{3}{4} + \frac{5}{9} + \frac{8}{5}$ .   |
| (6.) $1\frac{5}{11} + \frac{7}{12} + \frac{3}{4}$ .               | (20.) $\frac{4}{5} + \frac{3}{8} + \frac{7}{10} + \frac{3}{4}$ .  |
| (7.) $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{5}{6}$ .    | (21.) $\frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6}$ .   |
| (8.) $\frac{3}{4} + \frac{4}{5} + \frac{7}{10} + \frac{5}{6}$ .   | (22.) $\frac{1}{6} + \frac{3}{5} + \frac{5}{8} + \frac{1}{4}$ .   |
| (9.) $\frac{2}{5} + \frac{1}{9} + \frac{7}{10} + \frac{3}{8}$ .   | (23.) $\frac{4}{5} + \frac{5}{6} + \frac{9}{10} + \frac{7}{12}$ . |
| (10.) $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5}$ .   | (24.) $\frac{5}{6} + \frac{7}{10} + \frac{3}{8} + \frac{5}{11}$ . |
| (11.) $\frac{1}{4} + \frac{2}{3} + \frac{5}{6} + \frac{7}{5}$ .   | (25.) $3\frac{3}{4} + 6\frac{1}{3} + 9\frac{9}{11}$ .             |
| (12.) $\frac{1}{3} + \frac{4}{5} + \frac{5}{6} + \frac{7}{10}$ .  | (26.) $8\frac{4}{5} + 5\frac{5}{6} + 11\frac{9}{10}$ .            |
| (13.) $\frac{7}{4} + \frac{3}{11} + \frac{5}{9} + \frac{7}{12}$ . | (27.) $\frac{1}{5} + \frac{4}{7} + \frac{2}{3} + \frac{5}{6}$ .   |
| (14.) $2\frac{2}{3} + 3\frac{3}{4} + 9\frac{1}{11}$ .             | (28.) $\frac{5}{6} + \frac{9}{10} + \frac{7}{8}$ .                |

Add together—

- (29.)  $\frac{2}{4} + \frac{1}{2} + \frac{4}{5} + \frac{7}{10}$ .
- (30.)  $\frac{2}{3} + \frac{5}{6} + \frac{7}{10} + \frac{1}{12}$ .
- (31.)  $\frac{2}{3} + \frac{3}{5} + \frac{7}{5} + \frac{8}{5}$ .
- (32.)  $\frac{1}{3} + \frac{3}{8} + \frac{5}{8} + \frac{3}{8}$ .
- (33.)  $\frac{5}{8} + \frac{3}{4} + \frac{2}{5} + \frac{5}{8}$ .
- (34.)  $\frac{3}{8} + \frac{3}{4} + \frac{7}{5} + \frac{1}{12}$ .
- (35.)  $\frac{2}{5} + \frac{4}{5} + \frac{8}{5} + \frac{1}{11}$ .
- (36.)  $2\frac{3}{8} + 4\frac{4}{5} + 5\frac{9}{10}$ .
- (37.)  $9\frac{4}{5} + 6\frac{5}{7} + 12\frac{8}{9}$ .
- (38.)  $\frac{2}{5} + 11\frac{5}{24} + 2\frac{7}{45} + \frac{1}{10}$ .
- (39.)  $\frac{1}{2} + \frac{3}{8} + \frac{2}{5} + \frac{4}{5} + \frac{5}{6} + \frac{7}{12}$ .
- (40.)  $\frac{9}{11} + \frac{3}{22} + 10 + 1\frac{7}{33} + \frac{9}{66}$   
+  $\frac{8}{55}$ .
- (41.)  $\frac{2}{3} + \frac{3}{4} + \frac{5}{6}$ .
- (42.)  $\frac{2}{3} + \frac{4}{7} + \frac{7}{10}$ .
- (43.)  $\frac{1}{5}, \frac{1}{8}$ , and  $\frac{1}{12}$ .
- (44.)  $\frac{2}{5} + \frac{5}{12} + \frac{7}{24}$ .
- (45.)  $\frac{2}{5} + \frac{9}{10} + \frac{1}{15}$ .
- (46.)  $\frac{5}{11} + \frac{1}{22} + \frac{3}{4}$ .
- (47.)  $\frac{2}{5} + \frac{5}{6} + \frac{7}{12}$ .
- (48.)  $\frac{1}{2} + \frac{3}{4} + \frac{7}{5} + \frac{5}{6}$ .
- (49.)  $\frac{2}{3}, \frac{4}{5}, \frac{7}{10}$ , and  $\frac{8}{5}$ .

- (50.)  $\frac{2}{5} + \frac{1}{6} + \frac{7}{10} + \frac{4}{3}$ .
- (51.)  $2\frac{1}{2} + 3\frac{3}{4} + 4\frac{7}{8}$ .
- (52.)  $3\frac{3}{4} + 4\frac{1}{4} + 5\frac{2}{3}$ .
- (53.)  $\frac{7}{8} + 2\frac{1}{4} + 8 + 8\frac{5}{6}$ .
- (54.)  $\frac{1}{3} + 2\frac{1}{5} + 7\frac{1}{9} + 4\frac{5}{12}$ .
- (55.)  $4\frac{1}{2}, 7\frac{1}{3}, 3\frac{1}{5}$ , and 30.
- (56.)  $2\frac{5}{6} + \frac{3}{7} + 4\frac{9}{14} + 8$ .
- (57.)  $3\frac{1}{3} + 2\frac{3}{10} + 5\frac{11}{15} + 6\frac{7}{20}$ .
- (58.)  $13\frac{1}{3} + 5\frac{3}{10} + \frac{1}{4} + 100$ .
- (59.)  $3\frac{2}{3} + 4\frac{4}{5} + \frac{1}{4} + 10$ .
- (60.)  $2\frac{1}{2}, 7\frac{1}{3}, 2\frac{3}{10}$ , and  $9\frac{1}{2}$ .
- (61.)  $\frac{2}{3} + \frac{4}{7} + \frac{1}{15} + \frac{5}{21} + 8$ .
- (62.)  $5\frac{1}{2} + 4\frac{5}{8} + \frac{1}{12} + 1\frac{5}{6} + \frac{3}{10}$ .
- (63.)  $\frac{2}{3} + \frac{9}{25} + \frac{27}{125} + \frac{81}{625} + 20$ .
- (64.)  $1\frac{7}{8}, 3\frac{1}{5}, \frac{3}{25}$ , and  $2\frac{3}{15}$ .
- (65.)  $\frac{5}{12} + \frac{17}{28} + \frac{1}{32} + \frac{5}{35}$ .
- (66.)  $6\frac{1}{2} + 7\frac{4}{15} + 8\frac{7}{125} + 19$ .
- (67.)  $12\frac{4}{15} + 8\frac{7}{24} + 5\frac{3}{60}$ .
- (68.)  $\frac{4}{5} + \frac{5}{16} + \frac{7}{20} + \frac{8}{25} + \frac{19}{40}$ .
- (69.)  $8\frac{3}{5}, \frac{9}{10}, \frac{3}{4}, \frac{5}{21}$ , and 12.
- (70.)  $1\frac{1}{2} + 1\frac{2}{5} + \frac{7}{16} + 2\frac{11}{18} + \frac{1}{20}$ .

### VULGAR FRACTIONS.—SUBTRACTION.

- Rules:—(1) When the fractions have a common denominator, find the difference of the numerators, and under this difference write the common denominator.
- (2) When the fractions have not a common denominator reduce them to equivalent fractions having a common denominator, and then subtract as in (1).
- (3) If, after the fractions have been reduced to equivalent fractions having a common denominator, the lower numerator exceeds the upper numerator, add the *upper* numerator and the common denominator together, and from the sum subtract the lower numerator, and under this remainder write the common denominator. Then carry 1 to the whole number in the lower line, and subtract the sum from the upper line.

*N.B.*—The answer should always be given with the fraction its lowest terms.

Find the product of :—

- (41.)  $\frac{9}{10}$  of  $\frac{3}{4}$ ,  $\frac{8}{5}$ ,  $\frac{16}{105}$ , and  $\frac{7}{15}$  of  $2\frac{1}{2}$ .
- (42.)  $\frac{2}{3}$ ,  $5\frac{1}{3}$ ,  $\frac{4}{7}$ ,  $3\frac{1}{8}$ ,  $5\frac{1}{8}$ , and  $17\frac{1}{8}$ .
- (43.)  $5\frac{5}{7}$ ,  $\frac{8}{15}$ , 15,  $4\frac{7}{10}$ ,  $\frac{9}{10}$ , and  $8\frac{1}{4}$ .
- (44.)  $\frac{3}{15}$ ,  $5\frac{1}{3}$ ,  $1\frac{1}{2}$ ,  $\frac{2}{3}$  of 6, 70, and  $\frac{3}{14}$ .

Simplify :—

- (45.)  $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} \times (\frac{5}{6} + \frac{3}{4} + \frac{9}{10})$ .
- (46.)  $(\frac{9}{11} - \frac{5}{6}) \times 7\frac{1}{3} - (3\frac{1}{2} + 1\frac{3}{5})$ .
- (47.)  $\frac{1}{2} + \frac{1}{3} + \frac{2}{5} \times (\frac{5}{6} + \frac{3}{8} - \frac{2}{5})$ .
- (48.)  $(\frac{9}{14} - \frac{4}{18\frac{1}{2}}) \times 6\frac{2}{3} - (2\frac{1}{14} + 1\frac{1}{7})$ .
- (49.)  $\frac{1}{2} + \frac{1}{3} + \frac{1}{5} \times (\frac{3}{4} + \frac{5}{6} - \frac{4}{5})$ .
- (50.)  $(\frac{1}{18} - \frac{5}{12\frac{1}{2}}) \times 7\frac{1}{4} - (3\frac{1}{8} + 1\frac{8}{15})$ .

## VULGAR FRACTIONS.—DIVISION.

Rule :—Invert the divisor and multiply.

Mixed numbers ought, first of all, to be converted into improper fractions.

To divide a fraction by a whole number: multiply denominator of the given fraction by that number.

Example 1.

$$3\frac{1}{2} \div 7\frac{1}{4}$$

$$= \frac{7}{2} \div \frac{29}{4} = \frac{7}{2} \times \frac{4}{29} = \frac{14}{29} \text{ Ans.}$$

Example 2.

$$12\frac{3}{4} \div 9$$

$$= \frac{51}{4} \div 9$$

$$= \frac{51}{4} \times \frac{1}{9} = \frac{17}{12} = 1\frac{5}{12} \text{ Ans.}$$

In an expression where addition or subtraction is combined with multiplication or division, THE NUMBERS CONNECTED BY THE MULTIPLICATION AND DIVISION SIGNS ARE TO BE Solved BEFORE THE ADDITION AND SUBTRACTION.

Simplify

$$\frac{1}{2} + \frac{2}{3} \times \frac{3}{4} - \frac{7}{8} \div \frac{5}{4}$$

$$\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

$$\frac{7}{8} \div \frac{5}{4} = \frac{7}{8} \times \frac{4}{5} = \frac{7}{10}$$

$$\frac{1}{2} + \frac{1}{2} - \frac{7}{10} = 1 - \frac{7}{10} = \frac{3}{10} \text{ Ans.}$$

In an expression such as  $\frac{3}{4} \times \frac{7}{5} \div \frac{3}{2} - \frac{1}{10}$ , the signs  $\times$  and  $\div$  apply only to the number immediately following them.

$$\frac{3}{4} \times \frac{7}{5} \div \frac{3}{2} = \frac{1}{10}$$

$$\frac{3}{4} \times \frac{7}{5} \times \frac{2}{3} = \frac{7}{4}$$

$$\frac{7}{4} - \frac{1}{10} = \frac{6}{5} = \frac{3}{2} \text{ Ans.}$$

When *of* connects two numbers the expression is considered as one number. For example:—

$$\frac{7}{8} \div \frac{5}{8} \text{ of } \frac{2}{3} = \frac{7}{8} \times \frac{2}{3} = \frac{21}{10}$$

$$= 2\frac{1}{10} \text{ Ans.}$$

### Exercise 27.

- |   |  |  |
|---|--|--|
| (1.) $\frac{3}{7} \div \frac{4}{5}$ .     | (23.) $17 \div 2\frac{1}{5}$ .   | (45.) $9\frac{1}{5} \div \frac{1}{2}$ of 5.  |
| (2.) $\frac{2}{3} \div \frac{7}{5}$ .     | (24.) $1\frac{2}{3} \div 14$ .   | (46.) $12\frac{9}{10} \div \frac{1}{3}$ of $6\frac{3}{4}$ .                                |
| (3.) $4\frac{1}{2} \div \frac{7}{5}$ .    | (25.) $\frac{4}{5} \div 6$ .   | (47.) $\frac{3}{4}$ of $26\frac{3}{5} \div 2\frac{2}{3}$ .                                 |
| (4.) $5\frac{5}{11} \div 3\frac{2}{3}$ .  | (26.) $3\frac{1}{2} \div 5$ .  | (48.) $15\frac{1}{3} \times 2\frac{3}{5} \div 1\frac{3}{10}$ .                             |
| (5.) $9\frac{2}{5} \div 4\frac{2}{5}$ .   | (27.) $7\frac{9}{11} \div 11\frac{7}{11}$ .  | (49.) $17\frac{1}{4} \div (6\frac{1}{3} \times \frac{3}{4})$ .                             |
| (6.) $9\frac{3}{4} \div 7\frac{7}{12}$ .  | (28.) $\frac{1}{3} \div 4\frac{5}{11}$ .   | (50.) $6\frac{1}{2}$ of $4\frac{1}{5} \div 7\frac{1}{8}$ of $3\frac{1}{6}$ .               |
| (7.) $\frac{5}{6} \div \frac{8}{9}$ .     | (29.) $7\frac{1}{8} \div \frac{1}{11}$ .   | (51.) $14\frac{2}{9} \times 6\frac{2}{3} \div 3\frac{3}{8}$ .                              |
| (8.) $\frac{5}{8} \div \frac{4}{7}$ .     | (30.) $\frac{3}{5} \div \frac{8}{77}$ .  | (52.) $15\frac{2}{7} \div (5\frac{1}{3} \times \frac{5}{6})$ .                             |
| (9.) $5\frac{1}{3} \div \frac{3}{4}$ .    | (31.) $\frac{6}{5} \div \frac{4}{9}$ .   | (53.) $5\frac{3}{5}$ of $4\frac{5}{6} \div 7\frac{1}{8}$ of $3\frac{2}{3}$ .               |
| (10.) $\frac{9}{10} \div 4\frac{1}{5}$ .  | (32.) $\frac{1}{2}$ of $\frac{3}{5} \div \frac{8}{15}$ .                                 | (54.) $18\frac{1}{5} \times 4\frac{1}{6} \div 4\frac{1}{12}$ .                             |
| (11.) $8\frac{1}{4} \div 3\frac{1}{5}$ .  | (33.) $2\frac{1}{2} \div \frac{3}{5}$ of $\frac{2}{7}$ .                                 | (55.) $19\frac{3}{4} \div (7\frac{1}{6} \times \frac{3}{8})$ .                             |
| (12.) $6\frac{1}{5} \div 7\frac{3}{12}$ . | (34.) $3\frac{1}{8} \div 15$ .   | (56.) $9\frac{1}{5}$ of $3\frac{1}{8} \div 6\frac{7}{8}$ of $8\frac{5}{6}$ .               |
| (13.) $\frac{3}{4} \div \frac{5}{6}$ .    | (35.) $1\frac{5}{8} \times \frac{3}{5} \div 2\frac{4}{5}$ .                              | (57.) $\frac{3\frac{1}{2}}{\frac{1}{4} + 5\frac{1}{6} - 3\frac{3}{2}}$ of $2\frac{1}{5}$ . |
| (14.) $\frac{5}{7} \div \frac{4}{3}$ .    | (36.) $9 \div 6\frac{3}{8}$ .  | (58.) $21\frac{1}{5} \div 1\frac{1}{2}$ .  |
| (15.) $7\frac{1}{8} \div \frac{2}{7}$ .   | (37.) $2\frac{5}{8} \div 7$ .  | (59.) $\frac{4\frac{1}{5}}{\frac{1}{2} + 3\frac{1}{8} - \frac{5}{6}}$ of $6\frac{1}{3}$ .  |
| (16.) $\frac{2}{5} \div 6\frac{1}{5}$ .   | (38.) $12\frac{2}{3} \div 3\frac{3}{4}$ .  | (60.) $\frac{5\frac{1}{3}}{\frac{4}{5} + 5\frac{2}{3} - 3\frac{3}{4}}$ of $3\frac{1}{2}$ . |
| (17.) $5\frac{1}{3} \div 10\frac{1}{2}$ . | (39.) $3\frac{1}{2} \div 2\frac{1}{3}$ .   |  |
| (18.) $8\frac{1}{4} \div 4\frac{2}{5}$ .  | (40.) $4\frac{3}{4} \div 1\frac{2}{3}$ .   |  |
| (19.) $\frac{2}{3} \div \frac{5}{7}$ .    | (41.) $\frac{2\frac{1}{3}}{2\frac{1}{3}} \div \frac{2}{3}$ of $1\frac{5}{6}$ .           |  |
| (20.) $\frac{3}{8} \div \frac{9}{11}$ .   | (42.) $\frac{1}{2}$ of $\frac{3}{4} \div \frac{7}{8}$ .                                  |  |
| (21.) $\frac{2}{5} \div \frac{3}{2}$ .    | (43.) $\frac{4}{5}$ of $\frac{5}{8} \div \frac{7}{10}$ .                                 |  |
| (22.) $7 \div \frac{3}{5}$ .              | (44.) $\frac{1\frac{1}{2}}{\frac{1}{2} + 1\frac{1}{3} - \frac{1}{4}}$ of $\frac{2}{3}$ . |  |

## MISCELLANEOUS QUESTIONS ON VULGAR FRACTIONS.

### Exercise 28.

- (1.) Reduce to their lowest terms:— $\frac{225}{405}$ ,  $\frac{440}{1012}$ ,  $\frac{150}{210}$ .
- (2.) Change to integers or mixed numbers:— $\frac{5907}{25}$ ,  $\frac{85541}{37}$ ,  
 $\frac{16380}{864}$ ,  $\frac{39270}{102}$ .
- (3.) Reduce to improper fractions:— $164\frac{5}{14}$ ,  $47\frac{2}{1}$ ,  $104\frac{9}{12}$ .
- (4.) Reduce  $\frac{1}{2}$  of  $\frac{4}{5}$ ,  $\frac{2}{3}$ , and  $1\frac{1}{2}$  to equivalent fractions having the least common denominator.
- (5.) The product of two numbers is  $56\frac{2}{3}$ , and one of the numbers is  $12\frac{1}{2}$ . Find the other.
- (6.) What number divided by  $\frac{9}{28}$  will give a quotient of  $\frac{2}{3}$ ?
- (7.) What is the difference between  $\frac{3}{4}$  of  $6\frac{1}{2}$  and  $4\frac{1}{2} + \frac{5}{6}$ ?
- (8.) Reduce  $7s. 6d.$  to the fraction of 30s.
- (9.) Find the value of  $\frac{2}{3}$  of  $\frac{1}{2}$  of £4, 10s.
- (10.) Take  $\frac{7}{16}$  of £3 from  $\frac{1}{4}$  of 10 guineas.
- (11.) Find the value of  $\frac{3}{4}$  of  $21s. + \frac{2}{3}$  of  $5s. - \frac{3}{4}$  of  $5d.$
- (12.) What is the value of  $(75\frac{2}{3} - 7\frac{5}{6}) \div \frac{7}{8} \times 3\frac{1}{3}$ ?
- (13.) Simplify  $(\frac{2}{3} \text{ of } \frac{5}{6} \text{ of } 3\frac{3}{4} + 8\frac{2}{3}) \div (10\frac{1}{2} - 7\frac{5}{12})$ .
- (14.) Simplify  $(\frac{2}{5} \text{ of } \frac{6}{11} + 15) \times (15 + \frac{3}{4} \text{ of } \frac{5}{6})$ .
- (15.) Reduce  $\frac{421}{36}$  to a mixed number.
- (16.) Reduce  $\frac{156}{208}$  to its lowest terms.
- (17.) Find the value of  $\frac{1859}{8}$  of a day.
- (18.) Reduce  $21\frac{1}{2}$  to an improper fraction.
- (19.) Reduce  $126\frac{2}{3}$  to thirds.
- (20.) Reduce  $\frac{258}{360}$  to its lowest terms.
- (21.) Reduce  $\frac{1}{2}$  and  $\frac{4}{5}$  to a common denominator.
- (22.) What is the sum of  $\frac{2}{3}$ ,  $\frac{5}{6}$ , and  $\frac{1}{2}$ ?
- (23.) Add together  $\frac{9}{10}$ ,  $\frac{1}{2}$ , and  $3\frac{1}{5}$ .
- (24.) What is the difference between  $\frac{7}{8}$  and  $\frac{2}{3}$ ?
- (25.) Reduce  $\frac{9}{16}$ ,  $\frac{7}{8}$ , and  $\frac{3}{4}$  to a common denominator.
- (26.) If the sum of two fractions is  $1\frac{1}{5}$ , and one of them is  $\frac{9}{20}$ , what is the other?
- (27.) If the dividend be  $\frac{29}{21}$ , and the quotient  $\frac{5}{4}$ , what is the divisor?

- (28.) If the divisor be  $\frac{9}{13}$ , and the quotient  $3\frac{1}{3}$ , what is the dividend?
- (29.) Find the Greatest Common Measure of 680 and 782.
- (30.) Add  $\frac{7}{18}$ ,  $\frac{4}{14}$ ,  $\frac{9}{2}$ ,  $\frac{1}{8}$ , and  $\frac{3}{4}$ .
- (31.) Reduce 19s.  $4\frac{1}{2}d.$  to the fraction of £1.
- (32.) What fraction of 1 cwt. is 2 qrs. 7 lbs.
- (33.) What is the value of  $\frac{11}{16}$  of £1?
- (34.) What is the value of  $\frac{117}{960}$  of £1?
- (35.) Find the value of  $\frac{7}{15}$  of a day.
- (36.) Find the amount in £ s. d. of £ $32\frac{9}{16}$  + £ $18\frac{7}{12}$  + £ $49\frac{11}{40}$ .
- (37.) How much is nine times  $\frac{5}{8}$  greater than  $\frac{5}{8}$  of  $\frac{11}{8}$ ?
- (38.) What number added to the product of  $7\frac{1}{3}$  and  $9\frac{3}{4}$  will make 100?
- (39.) Find the difference between  $6\frac{1}{2}$  of  $9\frac{1}{4}$  and  $7\frac{1}{5} \div \frac{1}{5}$ .
- (40.) What fraction added to  $\frac{9}{17}$  will make unity?
- (41.) What number multiplied by  $\frac{7}{5}$  will give  $6\frac{1}{2}$ ?
- (42.) What number divided by  $\frac{4}{5}$  will give  $11\frac{3}{4}$ ?
- (43.) Find the difference between  $5\frac{1}{3}$  of  $7\frac{3}{8}$  and  $9\frac{1}{7} \div \frac{5}{24}$ .
- (44.) What fraction added to  $\frac{8}{15}$  will make unity?
- (45.) What number multiplied by  $\frac{4}{5}$  will give  $9\frac{3}{4}$ ?
- (46.) What number added to the product of  $7\frac{1}{8}$  and  $5\frac{3}{4}$  will make 60?
- (47.) Find the difference between  $7\frac{1}{4}$  of  $9\frac{3}{4}$  and  $5\frac{1}{4} \div \frac{1}{50}$ .
- (48.) Find the G.C.M. of 15,463 and 554,470.
- (49.) Find the G.C.M. of 15,075 and 18,725.
- (50.) Find the L.C.M. of 26, 13, 5, 40, 15.
- (51.) Find the G.C.M. of 2916 and 3582.
- (52.) Find the G.C.M. of 855 and 888.
- (53.) Find the G.C.M. of 4282 and 9828.
- (54.) Find the L.C.M. of 3, 12, 28, 27, 4, 6.
- (55.) Reduce to its lowest terms  $\frac{2108}{3813}$ .
- (56.) Simplify  $\frac{89168}{329472}$ .
- (57.) Reduce  $\frac{40457}{420325}$  to its lowest terms.
- (58.) Simplify  $\frac{2}{3}$  of  $\frac{5}{6}$  of  $\frac{4}{7}$  of  $\frac{1}{15}$  of  $\frac{8}{9}$ .
- (59.) Simplify  $\frac{2}{3}$  of  $\frac{5}{8}$  of  $\frac{6}{5}$  of  $\frac{3}{4}$  of  $\frac{2}{3}$ .
- (60.) Simplify  $\frac{9}{11} \times \frac{2}{5} \times \frac{1}{4} \times \frac{3}{44}$ .
- (61.) Simplify  $\frac{6}{5} \times \frac{4}{11} \times \frac{2}{3} \times \frac{10}{55} \times 9$ .
- (62.) Simplify  $\frac{4}{5}$  of  $\frac{3}{7}$  of  $\frac{5}{9}$  of  $\frac{6}{50}$  of 8.
- (63.) Simplify  $2\frac{1}{2}$  of 3 of  $\frac{7}{8}$  of  $5\frac{2}{7}$ .  
 (906)

#### III. *What is a *metabolite*?*

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THE VENICE

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- (96.) Add together  $1\frac{1}{2}$  of a guinea,  $\frac{2}{3}$  of a £1,  $\frac{5}{16}$  of 2s. 6d., and  $29\frac{1}{2}\%$  of  $7\frac{1}{2}d.$
- (97.) Find the value of  $\frac{1}{16}$  of a florin +  $\frac{2}{5}$  of half-a-crown -  $\frac{1}{10}$  of 5s. -  $\frac{3}{4}$  of a pound.
- (98.) What fraction of 30 miles is 1 furlong 20 poles?
- (99.) What fraction is £8, 6s. 8d. of £50?
- (100.) Reduce  $\frac{3}{4}$  of a yard to the fraction of a mile.
- 

## DECIMAL FRACTIONS.

A DECIMAL FRACTION is one whose denominator is 10 or any power of 10. For example,  $\frac{3}{10}$ ,  $\frac{99}{100}$ , are decimal fractions.

The decimal point (·) is used to mark the units place.

If we write any given figure immediately to the right of the decimal point, it represents only  $\frac{1}{10}$  of the value it would possess when written in the units place; for example,  $9 = \frac{9}{10}$ . Similarly, any given figure written two places to the right of the decimal point represents only  $\frac{1}{100}$  of the value it would possess in the units place:  $·09 = \frac{9}{100}$ , and so on.

·9 is called a *Decimal*, as distinguished from  $\frac{9}{10}$ , which is called a *Decimal Fraction*.

To express a decimal as a decimal fraction.

Rule:—Write the given decimal as numerator and for denominator, unity, followed by as many ciphers as there are places in the given decimal.

Example. Express ·875 as a decimal fraction. *Ans.*  $\frac{875}{1000}$ .

### Exercise 29.

Express the following decimals as decimal fractions:—

|             |              |                 |
|-------------|--------------|-----------------|
| (1.) ·396.  | (5.) 3·001   | (9.) ·00369.    |
| (2.) 39·67. | (6.) 5·7.    | (10.) 1·001.    |
| (3.) ·0096. | (7.) 77·9.   | (11.) 579·0076. |
| (4.) ·201.  | (8.) 6·9382. | (12.) ·000012.  |

---

To express a decimal fraction as a decimal.

Rule:—Write down the numerator, and put the point as many places to the left of the units figure (using ciphers if necessary to make up the required number) as there are ciphers in the denominator.

## Exercise 30.

Express the following as decimals:—

- (1.)  $\frac{19}{1000}, \frac{105}{10000}, \frac{378}{100000}$ .
- (2.)  $\frac{139}{10}, \frac{739}{10000}, \frac{59}{1000000}$ .
- (3.)  $\frac{17}{10000}, \frac{1396}{1000}, \frac{124}{10000000}$ .

## NUMERATION AND NOTATION OF DECIMALS.

The following is the *plan* of the Decimal System of Notation:—

|                    |                    |                         |                    |                    |                   |
|--------------------|--------------------|-------------------------|--------------------|--------------------|-------------------|
| Millions.          | Thousands.         | Units.                  | Thousandths.       | Millionths.        | Billionths.       |
| $\overbrace{000},$ | $\overbrace{000},$ | $\overbrace{000} \cdot$ | $\overbrace{000},$ | $\overbrace{000},$ | $\overbrace{000}$ |

To read any given decimal.

Rule:—Mark it into periods of 3 places each, beginning at the decimal point (adding ciphers, if necessary, to right of the decimal to make it an exact number of periods); each period is then read in the ordinary way, calling it by its proper name as indicated above. For example, read the following decimal: 9783·309560. When marked into periods it becomes 9,783·309,560, and is read, 9 thousands, 783 units, 309 thousandths, 560 millionths.

## Exercise 31.

Write in words the following decimals:—

- (1.) .5;
- (2.) .98;
- (3.) .096;
- (4.) .00896;
- (5.) 973·806;
- (6.) 32·0001;
- (7.) 1·10101;
- (8.) .00100101;
- (9.) .000707;
- (10.) .0101796;
- (11.) .97806;
- (12.) .097824.

To write in figures any given decimal expressed in words.

Rule:—Set down the *plan* as indicated above, and the notation of any number is obvious. For example, write in figures 12 thousandths 9 millionths.

|                    |                         |                    |                   |
|--------------------|-------------------------|--------------------|-------------------|
| Thousands.         | Units.                  | Thousandths.       | Millionths.       |
| $\overbrace{000},$ | $\overbrace{000} \cdot$ | $\overbrace{000},$ | $\overbrace{000}$ |
|                    |                         | ·                  | 012, 009          |

## Exercise 32.

Write the following in figures:—

- (1.) Fifteen thousandths and nineteen millionths.
- (2.) Seven hundred thousandths and twelve millionths.
- (3.) Six units and five hundred and eighty thousandths.

- (4.) One hundred and ten thousandths and forty-seven millionths.
- (5.) Eight hundred and sixty-three millionths.
- (6.) Three hundred and eighteen units and six hundred thousandths.
- (7.) Seven hundred thousandths and seventy millionths.
- (8.) Four hundred thousandths.
- (9.) Eighty millionths.
- (10.) Six hundred and thirteen thousandths fifteen millionths.

*N.B.*—Another method of reading decimals is sometimes adopted. For example,  $.6 = \frac{6}{10}$ , and consequently  $.6$  is read *six tenths*, instead of completing the period, and reading six hundred thousandths. Similarly  $.06 = \frac{6}{100}$ , and is read *six hundredths*, and so on.

To reduce a decimal to a vulgar fraction.

Rule:—Express the decimal as a decimal fraction, and then divide its terms by their G.C.M.

Example. Reduce  $.875$  to a vulgar fraction.

$$\begin{aligned} .875 &= \frac{875}{1000} \\ \text{G.C.M.} &= 125, \quad \therefore \frac{875}{125} = \frac{7}{8} \text{ Ans.} \end{aligned}$$

### Exercise 33.

Reduce the following decimals to vulgar fractions in their lowest terms:—

|                   |                  |                    |
|-------------------|------------------|--------------------|
| (1.) $.02$ .      | (11.) $.04$ .    | (21.) $15.1875$ .  |
| (2.) $.325$ .     | (12.) $.125$ .   | (22.) $379.2385$ . |
| (3.) $.575$ .     | (13.) $.585$ .   | (23.) $.00075$ .   |
| (4.) $.008$ .     | (14.) $.012$ .   | (24.) $19.385$ .   |
| (5.) $.6$ .       | (15.) $.2$ .     | (25.) $7.96$ .     |
| (6.) $.024$ .     | (16.) $.098$ .   | (26.) $234.375$ .  |
| (7.) $.1875$ .    | (17.) $.5855$ .  | (27.) $.00365$ .   |
| (8.) $.8471$ .    | (18.) $.4329$ .  | (28.) $999.976$ .  |
| (9.) $.00011$ .   | (19.) $.00021$ . | (29.) $8.395$ .    |
| (10.) $.425175$ . | (20.) $.57035$ . | (30.) $76.0085$ .  |

To reduce a vulgar fraction to a decimal.

Rule:—Divide the numerator by the denominator, extending the quotient to the right of the decimal point as far as may be necessary.

Example:—Reduce  $\frac{7}{8}$  to a decimal.

$$\begin{array}{r} 8 ) 7.000 \\ \underline{-64} \\ \phantom{8) } 60 \\ \phantom{8) } -56 \\ \phantom{8) } 40 \\ \phantom{8) } -32 \\ \phantom{8) } 8 \end{array} \quad \text{Ans.} = .875.$$

## Exercise 34.

Reduce the following vulgar fractions to decimals:—

- |   |   |
|---|---|
| (1.) $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{4}$ .            | (11.) $\frac{9}{25}$ , $\frac{11}{50}$ , $\frac{7}{20}$ .       |
| (2.) $\frac{2}{3}$ , $\frac{3}{5}$ , $\frac{1}{10}$ .           | (12.) $\frac{11}{15}$ , $\frac{1}{125}$ , $\frac{1}{50}$ .      |
| (3.) $\frac{1}{5}$ , $\frac{2}{3}$ , $\frac{3}{8}$ .            | (13.) $18\frac{1}{4}$ , $17\frac{7}{8}$ , $19\frac{1}{125}$ .   |
| (4.) $\frac{1}{125}$ , $\frac{1}{800}$ , $\frac{1}{64}$ .       | (14.) $86\frac{1}{100}$ , $99\frac{1}{32}$ , $74\frac{1}{64}$ . |
| (5.) $\frac{1}{18}$ , $\frac{1}{15}$ , $\frac{1}{16}$ .         | (15.) $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{1}{3}$ .           |
| (6.) $19\frac{1}{4}$ , $617\frac{1}{8}$ , $19\frac{1}{125}$ .   | (16.) $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{10}$ .          |
| (7.) $84\frac{14}{625}$ , $79\frac{1}{32}$ , $94\frac{1}{16}$ . | (17.) $\frac{1}{16}$ , $\frac{1}{32}$ , $\frac{1}{64}$ .        |
| (8.) $\frac{2}{3}$ , $\frac{3}{8}$ , $\frac{1}{2}$ .            | (18.) $\frac{1}{8}$ , $\frac{1}{700}$ , $\frac{99}{100}$ .      |
| (9.) $\frac{1}{6}$ , $\frac{1}{10}$ , $\frac{1}{16}$ .          | (19.) $18\frac{1}{8}$ , $19\frac{1}{16}$ , $17\frac{1}{64}$ .   |
| (10.) $\frac{1}{15}$ , $\frac{5}{64}$ , $\frac{7}{32}$ .        | (20.) $69\frac{1}{50}$ , $97\frac{1}{64}$ , $99\frac{1}{320}$ . |

The reduction of the above vulgar fractions result in w<sup>l</sup> are called TERMINATE decimals, i.e. decimals which come to end (terminus = the end). However, if the denominator o vulgar fraction contains any prime factor other than 2 or the resulting decimal will *not* terminate. For example reduced to a decimal is .6666... for ever. This kind of deci is called a REPEATING, CIRCULATING, or RECURRING decin When one or two figures repeat in regular succession pl a dot over them to notify the fact; but if a series of figu repeats place a dot over the first and last figures.

Reduce  $\frac{2}{3}$  to a decimal.

$$\begin{array}{r} 3 ) 2 \\ \overline{6666\dots} = \cdot\ddot{6}. \end{array}$$

Reduce  $\frac{4}{11}$  to a decimal.

$$\begin{array}{r} 11 ) 4 \\ \overline{363636\dots} = \cdot\ddot{3}\ddot{6}. \end{array}$$

Reduce  $\frac{5}{12}$  to a decimal.

$$\begin{array}{r} 12 ) 5 \\ \overline{41666\dots} = \cdot4\ddot{1}\ddot{6}. \end{array}$$

Reduce  $\frac{5}{7}$  to a decimal.

$$\begin{array}{r} 7 ) 5 \\ \overline{4285} \text{ &c.} = \cdot\ddot{7}\ddot{1}428\ddot{5}. \end{array}$$

Reduce to decimals:—

|                         |                                   |                                     |                                     |
|-------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| (21.) $\frac{1}{2}$ .   | (26.) $\frac{1\frac{2}{3}}{3}$ .  | (31.) $\frac{11}{60}$ .             | (36.) $\frac{1\frac{3}{4}}{8000}$ . |
| (22.) $5\frac{5}{8}$ .  | (27.) $\frac{9}{21}$ .            | (32.) $\frac{11\frac{2}{5}}{240}$ . | (37.) $\frac{17}{4000}$ .           |
| (23.) $\frac{3}{7}$ .   | (28.) $\frac{3\frac{3}{5}}{20}$ . | (33.) $\frac{9\frac{9}{10}}{280}$ . | (38.) $\frac{9}{5015}$ .            |
| (24.) $19\frac{7}{9}$ . | (29.) $\frac{17}{36}$ .           | (34.) $\frac{101}{605}$ .           | (39.) $\frac{7}{1100}$ .            |
| (25.) $5\frac{8}{11}$ . | (30.) $14\frac{5}{14}$ .          | (35.) $\frac{1}{15}$ .              | (40.) $\frac{114}{8000}$ .          |

To reduce a concrete quantity to the decimal of another concrete quantity.

Example:—Reduce 2 roods 25 poles to the decimal of 4 acres.

$$Ans. = \frac{2 \text{ roods } 25 \text{ poles}}{4 \text{ acres}} = \frac{105 \text{ poles}}{640 \text{ poles}} = .1640625.$$

$$Ans. = .1640625.$$

### Exercise 35.

Reduce—

- (1.) 5s. 6d. to the decimal of £1.
- (2.) 4s.  $8\frac{1}{2}d$ . to the decimal of a crown.
- (3.) 5s.  $9\frac{1}{4}d$ . to the decimal of a florin.
- (4.) 5 lbs. 5 ozs. to the decimal of 3 cwt.
- (5.) 5 stones to the decimal of  $5\frac{1}{2}$  tons.
- (6.)  $9\frac{1}{2}$  yards to the decimal of 3 furlongs.
- (7.) 3 quarts 1 pint 1 gill to the decimal of 3 quarters.
- (8.) 3 roods 25 poles to the decimal of 7 acs. 2 rds. 15 pls.
- (9.) £5, 6s.  $8\frac{1}{2}d$ . to the decimal of  $5\frac{1}{2}$  guineas.
- (10.) 4s. 6d. to the decimal of £1.
- (11.) 5s.  $6\frac{1}{2}d$ . to the decimal of half-a-crown.
- (12.) 4s.  $8\frac{1}{4}d$ . to the decimal of a shilling.
- (13.) 4 ozs. 4 drs. to the decimal of 2 stones.
- (14.) 5 yards to the decimal of  $2\frac{1}{2}$  miles.
- (15.)  $7\frac{1}{2}$  stones to the decimal of 15 cwt.
- (16.) 2 yards 1 ft. 6 ins. to the decimal of 3 furlongs.
- (17.) 3 furlongs 25 poles to the decimal of 4 mls. 2 furs. 15 pls.
- (18.) £7, 6s.  $8\frac{1}{2}d$ . to the decimal of  $4\frac{1}{2}$  guineas.
- (19.) 3s. 6d. to the decimal of £1.
- (20.) 1s.  $6\frac{1}{2}d$ . to the decimal of a florin.
- (21.) What decimal of half-a-crown is 3s.  $9\frac{1}{4}d$ ?
- (22.) What decimal of 2 miles is 3 yards 2 feet?

- (28.) What decimal of  $2\frac{1}{2}$  tons is 3 qrs.?
- (29.) What decimal of 5 stones is  $3\frac{1}{2}$  oza.?
- (30.) Reduce 7 lbs. 3 oza. 9 drs. to the decimal of 4 cwts.
- (31.) Reduce 2 roods 35 poles to the decimal of 5 acres. 2 rds. 25 pls.
- (32.) What decimal of  $2\frac{1}{2}$  guineas is £6, 7s.  $9\frac{1}{2}$ d.?
- (33.) Reduce 10s. 4d. to the decimal of £1, 7s. 6d.
- (34.) Reduce 8 yds. 9 inches to the decimal of 1 mile.
- (35.) What decimal of a ton is 5 cwts. 1 qr. 13 lbs. 9 ozas?

To find the value of a concrete decimal.

Example:—Find the value of '745 of £1.

$$\begin{array}{r} \text{£} & .745 \\ & 20 \\ s. & \overline{14}900 \\ & 12 \\ d. & \overline{10}800 = 10\frac{4}{5}d. \end{array}$$

*Ans.* = 14s.  $10\frac{4}{5}$ d.

### Exercise 36.

Find the value of—

- |                             |                          |
|-----------------------------|--------------------------|
| (1.) '75 of a shilling.     | (21.) '596 of 3 lbs.     |
| (2.) '3625 of £1.           | (22.) '9875 of 4 tons.   |
| (3.) '7825 of £1.           | (23.) '0095 of 1 yard.   |
| (4.) '990625 of £1.         | (24.) '005 of 1 acre.    |
| (5.) '0024 of £1.           | (25.) '45 of £1.         |
| (6.) '176 of £1.            | (26.) '9 of a guinea.    |
| (7.) '3125 of 1 ton.        | (27.) '75 of 2s. 6d.     |
| (8.) '875 of 1 acre.        | (28.) '935 of 3s. 4d.    |
| (9.) '0625 of 1 shilling.   | (29.) '674 of 2 bushels. |
| (10.) '47692 of 1 mile.     | (30.) '7985 of 6 acres.  |
| (11.) '303125 of 1 day.     | (31.) '0084 of 2 lbs.    |
| (12.) '68276 of 1 ton.      | (32.) '005 of a mile.    |
| (13.) '40625 of 1 lb. (Av.) | (33.) '65 of £1.         |
| (14.) '07119 of 1 ton.      | (34.) '48 of a florin.   |
| (15.) '08675 of £1.         | (35.) '75 of 3s. 4d.     |
| (16.) £3·5478.              | (36.) '936 of 8s.        |
| (17.) '85 of £1.            | (37.) '1498 of 3 lbs.    |
| (18.) '94 of a crown.       | (38.) '0856 of 4 miles.  |
| (19.) '85 of 7s. 6d.        | (39.) '0078 of 3 stones. |
| (20.) '634 of 6s. 8d.       | (40.) '875 of 4 yds.     |

## DECIMAL FRACTIONS.—ADDITION.

Rule:—Arrange the numbers so as to have the decimal points in a vertical line, and proceed exactly as in simple addition.

Example:—Add 49·706; 3·97; 48; and ·0076.

$$\begin{array}{r}
 49\cdot706 \\
 3\cdot97 \\
 48 \\
 \cdot0076 \\
 \hline
 101\cdot6836 \quad Ans.
 \end{array}$$

## Exercise 37.

- (1.) Find the sum of 2·125, 13·07, 7·8, and ·3142.
- (2.) Add 4·314, 36·42, 120·0042, ·4276.
- (3.) 2·7 + 30·84 + 75·1 + 126·414 + 3·06.
- (4.) 1·7 + 4·45 + 6·75 + 1·705 + 50 + ·05.
- (5.) Add together 105·7, 19·4, 1119·05, 648·006, and 19·041.
- (6.) 48·1 + ·0481 + 4·81 + ·00481 + 481.
- (7.) 1·151 + 13·29 + 116·283 + 9·0275 + ·61.
- (8.) What is the sum of ·8, ·087, ·626, ·8885, and ·49628?
- (9.) 91·003 + 16·4691 + 160·00471 + 700·05 + 900·0006 + ·0315.
- (10.) Add together 42·3, 13·06, 8·049, 1·6, and ·037.
- (11.) 12·326 + 204·09 + 8·3024 + 52·007 + 324·1.
- (12.) Find the sum of 4031·06, 108·304, 9·001345, 76·739, and 250·0007.
- (13.) ·608242 + ·0315044 + ·8034 + ·086 + ·9106.
- (14.) Find the sum of £28·5, £125, £3·875, and £·945.
- (15.) What is the sum of 36 hundredths, 207 thousandths, 321 ten-thousandths, and 75 hundred-thousandths?
- (16.) What is the sum of 15 hundred, 15 tens, 15 tenths, and 15 hundredths?
- (17.) Find the sum of 26 tenths, 416 hundredths, 9 thousandths, and 5 millionths.
- (18.) Add together 68·075, ·68075, 75·865, and 178.
- (19.) 487 + 9·2856 + 375·28 + 425 + 82·96785.
- (20.) ·567 + ·42839 + ·0012 + ·8005 + ·0692.

—  
—  
—  
—  
—

1. The following four numbers;  
2. The date and the month;  
3. The day of the month;  
4. The year in four terms.

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7-24-46 116-304

卷之三

Learn to write the decimal numbers as in Simple.

卷之三

177-1 lake 2371.  
177-2 lake 2157.  
177-3 lake 1907.  
177-4 lake 151679.  
177-5 lake 76325.  
177-6 lake 185.

17 88 from 1.375.  
18 947 from .84032.  
19 4.273 from 297.5.  
20 19 from 9.00372.

- (21.) From thirty thousand take three millionths.  
 (22.) I sold a horse for £300, gaining thereby £10·75; what did the horse cost me?  
 (23.) Take 33 ten-millionths from 00008.  
 (24.) A man who had £1000 in the bank withdrew £450·25; how much has he there now?  
 (25.) From a piece of cloth containing 56·25 yards, 24 $\frac{1}{2}$  yards were cut; how many yards remained?  
 (26.) Find the difference between 10 and 01.  
 (27.) What must be added to 0·75 to make 1?  
 (28.) Find the value of 78·06 - 7854 - 129274.  
 (29.) (4·5 + 0·36) - (19 - 0·027).  
 (30.) (155·006 - 32) - (80·0032 + 55·1).

## DECIMAL FRACTIONS.—MULTIPLICATION.

Rule:—Arrange the figures as most convenient for multiplying, and then proceed as in Simple Multiplication. From the right hand of the product count off as many places of decimals as there are altogether in the multiplicand and multiplier. If there are not sufficient figures in the answer to allow of this, make up the required number by prefixing ciphera.

Example:—36·02  $\times$  6·4.

$$\begin{array}{r}
 36\cdot02 \\
 \times 6\cdot4 \\
 \hline
 14408 \\
 21612 \\
 \hline
 230\cdot528 \quad \text{Ans.}
 \end{array}$$

## Exercise 39.

Multiply—

- |   |   |
|---|---|
| (1.) 341·45 by 007<br>(2.) 3020 by 015.<br>(3.) 132 by 241.<br>(4.) 23 by 009.<br>(5.) 7·02 by 5·27.<br>(6.) 004 by 04.<br>(7.) 2461 by 0529.<br>(8.) 007853 by 035.<br>(9.) 25·238 by 12·17. | (10.) 4·285 by 17·05.<br>(11.) 26·087 by 048.<br>(12.) 3045 by 00061.<br>(13.) 6·23 by 049.<br>(14.) 1745 by 100.<br>(15.) 875 by 125.<br>(16.) 436 $\times$ 839.<br>(17.) 00674 $\times$ 321.<br>(18.) 23 $\times$ 25. |
|---|---|

Multiply—

- |                               |                               |
|-------------------------------|-------------------------------|
| (19.) $.095 \times 1000.$     | (25.) $8.02 \times 18.27.$    |
| (20.) $.00514 \times 867.59.$ | (26.) $66.087 \times .408.$   |
| (21.) $941.45 \times .009.$   | (27.) $3045 \times .00061.$   |
| (22.) $8020 \times .016.$     | (28.) $8.23 \times .049.$     |
| (23.) $.00132 \times .241.$   | (29.) $.1745 \times 100.$     |
| (24.) $.6346 \times .009.$    | (30.) $.00875 \times .67125.$ |

- (31.) Multiply  $2.184$  by  $.039$  and the product by  $.0016$ .
- (32.) Multiply sixty-five thousandths by two hundred and twenty ten-thousandths.
- (33.) If an acre of land produce  $35.7$  bushels, what quantity will  $5.125$  acres produce?
- (34.) If a man earns £ $875$  in 1 day, how much will he earn in  $9\frac{1}{4}$  days?
- (35.) Find the value of  $46$  acres at £ $75.375$  per acre.
- (36.) One rod contains  $16.5$  feet; how many feet are there in  $30.005$  rods?
- (37.) If a man travel  $3.75$  miles an hour, how far will he go in  $9.5$  hours?
- (38.) Find the value of  $6\frac{1}{2} \times .8 \times 3.16.$
- (39.) Find the value of  $.07 \times 2.4 \times .015.$
- (40.) The divisor is  $.288$  and the quotient is  $.0625$ ; what is the dividend?

### DECIMAL FRACTIONS.—DIVISION.

1. When the divisor is a whole number and less than 12.

Rule:—Proceed as in simple short division, placing the decimal point in the quotient *exactly below* the decimal point in the dividend.

Example:— $372.908 \div 8.$

$$\begin{array}{r} 8)372.908 \\ \underline{46} \underline{61} \underline{35} \end{array} \text{ Ans.}$$

2. When the divisor is a whole number and greater than 12.

Rule:—Proceed as in simple long division, placing the decimal point in the quotient *exactly above* the decimal point in the dividend.

**Example:**— $3907\cdot076 \div 245$ .

$$\begin{array}{r}
 15\cdot947248 \\
 245) \overline{3907\cdot076} \\
 \underline{245} + \underline{\underline{076}} \\
 1457 \\
 1225 \\
 \underline{\underline{2320}} \\
 2205 \\
 \underline{\underline{1157}} \\
 980 \\
 \underline{\underline{1776}} \\
 1715 \\
 \underline{\underline{610}} \\
 490 \\
 \underline{\underline{1200}} \\
 980 \\
 \underline{\underline{2200}} \\
 1960 \\
 \underline{\underline{240}}
 \end{array}$$

*Ans.* 15·947248.

### 3. When the divisor contains a decimal.

Rule:—(1) Make the divisor a whole number by removing the decimal point to the right of it.

(2) Remove the decimal point to the right over a corresponding number of places in the dividend.

(3) Proceed as in simple long division, taking care to place the decimal point in the quotient *exactly above* the decimal point in the dividend.

**Example:**— $73107 \div 8\cdot123$ .

$$\begin{array}{r}
 \cdot09 \\
 8123) \overline{731\cdot07} \\
 \underline{73107} \\
 0
 \end{array}$$

*Ans.* = ·09.

**Exercise 40.**

- (1.)  $954\cdot376 \div 4$ .  
 (2.)  $59\cdot576 \div 6$ .  
 (3.)  $3\cdot2907 \div 7$ .  
 (4.)  $24\cdot6392 \div 8$ .  
 (5.)  $9\cdot0762 \div 9$ .  
 (6.)  $1\cdot0768 \div 10$ .  
 (7.)  $59\cdot2987 \div 11$ .  
 (8.)  $3\cdot3096 \div 12$ .  
 (9.)  $937\cdot2968 \div 57$ .  
 (10.)  $93\cdot9682 \div 98$ .

- (11.)  $715\cdot39684 \div 89$ .  
 (12.)  $39\cdot0762 \div 876$ .  
 (13.)  $1\cdot09682 \div 97$ .  
 (14.)  $15\cdot39682 \div 78$ .  
 (15.)  $7\cdot09683 \div 237$ .  
 (16.)  $12\cdot1927 \div 58$ .  
 (17.)  $9\cdot2983 \div 85$ .  
 (18.)  $3\cdot396 \div 92$ .  
 (19.)  $0\cdot96673 \div 76$ .  
 (20.)  $32\cdot96834 \div 917$ .

**Exercise 41.**

- (1.) Divide  $9375$  by  $075$ .  
 (2.) Divide  $18$  by  $288$ .  
 (3.) Divide  $15\cdot875$  by  $0025$ .  
 (4.) Divide  $44$  by  $4$ .  
 (5.) Divide  $15$  by  $25$ .  
 (6.) Divide  $3276$  by  $42$ .  
 (7.) Divide  $00288$  by  $08$ .  
 (8.) Divide  $0992$  by  $32$ .  
 (9.) Divide  $17\cdot6$  by  $44$ .  
 (10.) Divide  $00000021$  by  $0007$ .  
 (11.) Divide  $56$  by  $1\cdot12$ .  
 (12.) Divide  $1496\cdot04$  by  $10$ .  
 (13.) Divide  $1596\cdot04$  by  $1000$ .  
 (14.) Divide  $00207$  by  $009$ .  
 (15.) Divide  $307\cdot14646$  by  $12\cdot17$ .

- (16.)  $215\cdot7 \div 86\cdot28$ .  
 (17.)  $25\cdot2835 \div 7\cdot81$ .  
 (18.)  $7\cdot3926 \div 2\cdot22$ .  
 (19.)  $172\cdot86 \div 402$ .  
 (20.)  $24\cdot75 \div 25$ .  
 (21.)  $11\cdot83 \div 845$ .  
 (22.)  $568\cdot944 \div 3\cdot24$ .  
 (23.)  $125\cdot6334 \div 38\cdot42$ .  
 (24.)  $696\cdot6395 \div 12\cdot35$ .  
 (25.)  $3132\cdot9696 \div 387\cdot2$ .  
 (26.)  $17\cdot28 \div 0144$ .  
 (27.)  $1708\cdot4592 \div 00024$ .  
 (28.)  $4 \div 00255$ .  
 (29.)  $0123 \div 3\cdot21$ .  
 (30.)  $032 \div 2\cdot137$ .

- (31.)  $28\cdot9 \div 17$ .  
 (32.)  $289 \div 17$ .  
 (33.)  $0216 \div 25$ .  
 (34.)  $1\cdot5 \div 0064$ .  
 (35.)  $6\cdot82 \div 0125$ .  
 (36.)  $064 \div 008$ .  
 (37.)  $2\cdot4 \div 06$ .  
 (38.)  $144 \div 6$ .  
 (39.)  $002 \div 1\cdot6$ .  
 (40.)  $45 \div 15$ .

- (41.)  $5\cdot7 \div 2\cdot5$ .  
 (42.)  $2\cdot375 \div 250$ .  
 (43.)  $025 \div 500$ .  
 (44.)  $7\cdot73682 \div 101\cdot4$ .  
 (45.)  $0096 \div 1\cdot2$ .  
 (46.)  $03625 \div 29$ .  
 (47.)  $800 \div 00125$ .  
 (48.)  $384\cdot006 \div 123$ .  
 (49.)  $5 \div 25$ .  
 (50.)  $055757592 \div 00920$ .

## MISCELLANEOUS QUESTIONS ON DECIMALS.

## Exercise 42.

- (1.) Divide 324 by 6400.
- (2.) What vulgar fraction is equivalent to .125?
- (3.) Reduce  $\frac{7}{8}$  to a decimal.
- (4.)  $.016004 \div .004$ .
- (5.) Reduce  $\frac{17}{25}$  to a decimal.
- (6.) Add together 1.465, .0095, 37.15, 28.457, and 16.1685, and divide the sum by .0296.
- (7.) Reduce  $\frac{5}{8}$  of  $\frac{12}{5} + 5\frac{1}{2}$  to a decimal.
- (8.) What is the difference between  $.675 \div .15$  and  $.23 \times .009$ ?
- (9.) To .02 times 32.5 add 5.7 times  $(16.04 - 12.0026)$ .
- (10.) How many times can 1.05 be taken from 4.725?
- (11.) Divide 5 by  $.8 \times .025$ .
- (12.) What is the difference between 5 times 2.5 and  $5 \times 25$ ?
- (13.) Multiply 3 times the sum of .367 and .033 by twice the difference between 7.5 and .57.
- (14.) Express 17 lbs. 10 oz. 6 dwt. 15 grains (Troy) as a decimal of 1 lb. Troy, and also of 1 lb. Avoirdupois.
- (15.) Reduce £1, 14s. to the decimal of 8s. 4d.
- (16.) How often is .0018 contained in 4.068?
- (17.)  $.000133 \div 8.75$ .
- (18.) Reduce 8 lbs. 5 oz. 14 drams to the decimal of 1 quarter.
- (19.) Find the value of  $(1.45 \times 26) + (10 \times 3.74)$ .
- (20.) Find the value of  $(100 - 4.75) \times (.09 + 6.31) + 400$ .
- (21.) Divide .8 by 4;  $.8 \div .4$ ;  $.08 \div .04$ ;  $.008 \div .400$ .
- (22.) Express  $\frac{23}{10000}$  as a decimal.
- (23.) Reduce .0125 to a vulgar fraction.
- (24.) What decimal is equivalent to  $\frac{9}{14}$ ?
- (25.) What is the difference between 20 thousand and twenty thousandths?
- (26.) What is the quotient when .125 is divided by 8000?
- (27.) From the sum of 256.07 and 5.0125 take their difference.
- (28.) If the product of two factors is .00207, and one of them is .009, what is the other?



- (28.) What is the difference between 22·4735 of £1 and 17·2845 of a guinea?
- (29.) Find the value of ·01625 of £204, 3s. 4d.
- (30.) Find the value of 3·45 of 7 guineas.
- (31.) Add together 4·35 tons, 5·39 cwts., and 1·44 qrs.
- (32.) Find the value of ·47916 of £3.
- (33.) Find the difference between 2·95 tons and 17·09375 cwts.
- (34.) A clerk copied 62·5 instead of ·625 of £100; what was the amount of his error?
- (35.) Convert  $\frac{7}{28}$  and  $\frac{4}{7}$  into decimals.
- (36.) From the sum of 62·7849 and 95·3860 take 79·3821.
- (37.) Add together: twenty-five hundredths, six hundred and fifty-four thousandths, one hundred and ninety-nine thousandths, and seven thousand five hundred and sixty-nine ten-thousandths.
- From ten take ten thousandths.
- (38.) What is the difference between forty thousand and forty thousandths?
- (39.) Multiply sixty-five hundredths by nine hundredths.

## FRACTIONAL PROPORTION.

### Exercise 43.

- (1.) If  $2\frac{1}{2}$  yards of cloth cost £1, find the cost of  $12\frac{1}{2}$  yards.
- (2.) If the  $\frac{7}{8}$  of a ship is worth £8400, find the value of  $\frac{1}{2}$  of it.
- (3.) If  $3\frac{1}{2}$  ozs. of tea cost  $8\frac{3}{4}d.$ , find the cost of  $16\frac{5}{8}$  ozs.
- (4.) If  $17\frac{1}{2}$  yards cost £15, 12s.  $4\frac{1}{2}d.$ , what will  $34\frac{1}{4}$  yds. cost?
- (5.) If  $25\frac{1}{2}$  yds. cost £2, 6s. 3d., what must I pay for  $12\frac{3}{4}$  yds.?
- (6.) What is the value of  $\frac{1}{2}\frac{5}{8}$  of a ship when  $\frac{7}{8}$  of it sells for £525?
- (7.) If  $\frac{4}{5}$  of a field sell for £90, 7s. 6d., what would be the price of  $\frac{7}{10}$  of it?
- (8.) If the  $\frac{2}{3}$  of an acre cost £18 $\frac{7}{8}$ , find the cost of  $1\frac{5}{8}$  acres.
- (9.) How many lbs. may be bought for 17 $\frac{7}{8}$ s. when  $\frac{2}{3}$  lb. cost  $1\frac{1}{3}$ s.?
- (10.) If  $\frac{3}{4}$  of a farm sell for £76, what is the value of  $\frac{10}{21}$  of it?  
(906)

THEORY OF PROBABILITIES

Let us suppose that we have purchased or  
bought a certain number of items. Let us  
suppose that we have bought 100 items.  
Now let us suppose that we have  
bought 100 items at different prices.  
Let us suppose that the total price  
of all the items is \$100.00.  
Now let us suppose that we have  
bought 100 items at different prices.  
Let us suppose that the total price  
of all the items is \$100.00.  
Now let us suppose that we have  
bought 100 items at different prices.  
Let us suppose that the total price  
of all the items is \$100.00.  
Now let us suppose that we have  
bought 100 items at different prices.  
Let us suppose that the total price  
of all the items is \$100.00.  
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Let us suppose that the total price  
of all the items is \$100.00.

## DEFINITION

Probability is a mathematical method of calculating the value of  
certain probabilities by means of fractions or simple parts.  
A fraction is said to be an aliquot part of another when  
it is contained in that other an exact number of times. For  
example 10 is an aliquot part of 100.

## TABLE OF ALIQUOT PARTS.

## MONEY.

|         |                        |         |                             |
|---------|------------------------|---------|-----------------------------|
| 10s.    | = $\frac{1}{2}$ of £1. | 3s. 4d. | = $\frac{1}{3}$ of 10s.     |
| 6s. 8d. | = $\frac{1}{3}$ "      | 2s. 6d. | = $\frac{1}{4}$ "           |
| 5s.     | = $\frac{1}{4}$ "      | 2s. 6d. | = $\frac{1}{2}$ of 5s.      |
| 4s.     | = $\frac{1}{5}$ "      | 2s.     | = $\frac{1}{6}$ of 10s.     |
| 3s. 4d. | = $\frac{1}{6}$ "      | 2s.     | = $\frac{1}{2}$ of 4s.      |
| 2s. 6d. | = $\frac{1}{8}$ "      | 1s. 8d. | = $\frac{1}{3}$ of 10s.     |
| 2s.     | = $\frac{1}{10}$ "     | 1s. 8d. | = $\frac{1}{4}$ of 6s. 8d.  |
| 1s. 8d. | = $\frac{1}{12}$ "     | 1s. 8d. | = $\frac{1}{5}$ of 5s.      |
| 1s. 4d. | = $\frac{1}{15}$ "     | 1s. 8d. | = $\frac{1}{2}$ of 3s. 4d.  |
| 1s. 3d. | = $\frac{1}{18}$ "     | 1s. 4d. | = $\frac{1}{3}$ of 6s. 8d.  |
| 1s.     | = $\frac{1}{20}$ "     | 1s. 4d. | = $\frac{1}{5}$ of 4s.      |
| 6d.     | = $\frac{1}{40}$ "     | 1s. 3d. | = $\frac{1}{6}$ of 10s.     |
| 6d.     | = $\frac{1}{2}$ of 1s. | 1s. 3d. | = $\frac{1}{4}$ of 5s.      |
| 4d.     | = $\frac{1}{3}$ "      | 1s. 3d. | = $\frac{1}{2}$ of 2s. 6d.  |
| 3d.     | = $\frac{1}{4}$ "      | 10d.    | = $\frac{1}{12}$ of 10s.    |
| 2d.     | = $\frac{1}{5}$ "      | 10d.    | = $\frac{1}{8}$ of 6s. 8d.  |
| 1½d.    | = $\frac{1}{8}$ "      | 9d.     | = $\frac{1}{10}$ of 7s. 6d. |
| 1d.     | = $\frac{1}{12}$ "     | 8d.     | = $\frac{1}{5}$ of 3s. 4d.  |
| ½d.     | = $\frac{1}{2}$ of 1d. | 7½d.    | = $\frac{1}{8}$ of 5s.      |
| ¼d.     | = $\frac{1}{4}$ "      | ¾d.     | = $\frac{1}{5}$ of 6d.      |

## WEIGHT.

|          |                           |
|----------|---------------------------|
| 10 cwts. | = $\frac{1}{2}$ of 1 ton. |
| 5 "      | = $\frac{1}{4}$ "         |
| 4 "      | = $\frac{1}{5}$ "         |
| 2 "      | = $\frac{1}{10}$ "        |
| 1 "      | = $\frac{1}{20}$ "        |
| 2 qrs.   | = $\frac{1}{2}$ of 1 cwt. |
| 1 qr.    | = $\frac{1}{4}$ "         |
| 16 lbs.  | = $\frac{1}{5}$ "         |
| 14 "     | = $\frac{1}{8}$ "         |
| 14 "     | = $\frac{1}{2}$ of 1 qr.  |
| 7 "      | = $\frac{1}{4}$ "         |
| 4 "      | = $\frac{1}{7}$ "         |
| 3½ "     | = $\frac{1}{8}$ "         |
| 2 "      | = $\frac{1}{14}$ "        |

## AREA.

|         |                            |
|---------|----------------------------|
| 2 roods | = $\frac{1}{2}$ of 1 acre. |
| 1 rood  | = $\frac{1}{4}$ "          |
| 20 per. | = $\frac{1}{2}$ of 1 rood. |
| 10 "    | = $\frac{1}{4}$ "          |
| 8 "     | = $\frac{1}{5}$ "          |
| 5 "     | = $\frac{1}{8}$ "          |
| 4 "     | = $\frac{1}{10}$ "         |
| 2 "     | = $\frac{1}{20}$ "         |
| 20 "    | = $\frac{1}{8}$ of 1 acre. |
| 16 "    | = $\frac{1}{10}$ "         |
| 10 "    | = $\frac{1}{18}$ "         |

## PRACTICE.

When the value of each article is less than a penny.

- (1) Find the value of 975 at 3d. each.

|                         |  |   |
|-------------------------|--|---|
| $\frac{d}{d}$           | $\frac{d}{d}$                            | 975 = the price at a penny each.  |
| $\frac{1}{2} \text{d.}$ | $\frac{1}{2} \text{d.}$                  | 487½ = " " halfpenny each.  |
| $\frac{1}{4} \text{d.}$ | $\frac{1}{4} \text{d.}$                  | 243¼ = " " farthing each.   |
|                         | $12 \frac{1}{2}) 731 \frac{1}{2}$        |   |
|                         | $20) 69 \frac{11}{4}$                    |   |
|                         | $\underline{58 \frac{11}{4}}$            |   |
|                         | $\underline{\underline{11 \frac{1}{4}}}$ | $\underline{\underline{\text{£3 0 11} \frac{1}{4}}} = \text{the price at } \frac{1}{4} \text{d. each.}$ |

**When the value of each article is less than a shilling.**

- (2) Find the value of 975 articles at 9 $\frac{1}{2}$ d.

When the value of each article is less than a pound.

- (3) Find the value of 139 articles at 12s. 4½d.

| <i>s.</i>     | <i>d.</i> |   | <i>£</i>      | <i>s.</i> | <i>d.</i>      |                                      |
|---------------|-----------|---|---------------|-----------|----------------|--------------------------------------|
|               |           |   | 139           | 0         | 0              | = the price at £1.                   |
| 10            | 0         | = | $\frac{1}{3}$ | 69        | 10             | 0 = " 10s.                           |
| 2             | 0         | = | $\frac{1}{6}$ | 13        | 18             | 0 = " 2s.                            |
| 4             |           | = | $\frac{1}{9}$ | 2         | 6              | 4 = " 4d.                            |
| $\frac{1}{2}$ |           | = | $\frac{1}{8}$ | 0         | 5              | $9\frac{1}{2}$ = " $\frac{1}{2}d.$   |
|               |           |   | £86           | 0         | $1\frac{1}{2}$ | = the price at 12s. $4\frac{1}{2}d.$ |

### **Exercise 44.**

**Find the cost of—**

- (1-8) 670 at  $\frac{1}{2}d$ ,  $\frac{1}{2}d$ ,  $\frac{2}{3}d$ ,  $1d$ ,  $1\frac{1}{2}d$ ,  $1\frac{2}{3}d$ , and  $2d$ .  
 (9-16) 945 at  $2\frac{1}{2}d$ ,  $2\frac{2}{3}d$ ,  $3d$ ,  $3\frac{1}{2}d$ ,  $3\frac{1}{3}d$ ,  $3\frac{2}{3}d$ , and  $4d$ .  
 (17-24) 765 at  $4\frac{1}{2}d$ ,  $4\frac{1}{3}d$ ,  $5d$ ,  $5\frac{1}{2}d$ ,  $5\frac{2}{3}d$ , and  $6d$ .

Find the cost of—

- (25-32.) 976 at  $6\frac{1}{4}$ d.,  $6\frac{1}{2}$ d.,  $6\frac{3}{4}$ d., 7d.,  $7\frac{1}{4}$ d.,  $7\frac{3}{4}$ d., and 8d.  
 (33-40.) 937 at  $8\frac{1}{4}$ d.,  $8\frac{1}{2}$ d.,  $8\frac{3}{4}$ d., 9d.,  $9\frac{1}{4}$ d.,  $9\frac{3}{4}$ d., 10d.  
 (41-47.) 409 at  $10\frac{1}{4}$ d.,  $10\frac{1}{2}$ d., 11d.,  $11\frac{1}{4}$ d.,  $11\frac{1}{2}$ d.,  $11\frac{3}{4}$ d., 1s.  
 (48-55.) 740 at  $\frac{1}{4}$ d.,  $\frac{1}{2}$ d.,  $\frac{3}{4}$ d., 1d.,  $1\frac{1}{4}$ d.,  $1\frac{1}{2}$ d.,  $1\frac{3}{4}$ d., and 2d.  
 (56-63.) 365 at  $2\frac{1}{4}$ d.,  $2\frac{1}{2}$ d.,  $2\frac{3}{4}$ d., 3d.,  $3\frac{1}{4}$ d.,  $3\frac{3}{4}$ d., and 4d.  
 (64-71.) 987 at  $4\frac{1}{4}$ d.,  $4\frac{1}{2}$ d.,  $4\frac{3}{4}$ d., 5d.,  $5\frac{1}{4}$ d.,  $5\frac{3}{4}$ d., and 6d.  
 (72-79.) 698 at  $6\frac{1}{4}$ d.,  $6\frac{1}{2}$ d.,  $6\frac{3}{4}$ d., 7d.,  $7\frac{1}{4}$ d.,  $7\frac{3}{4}$ d., and 8d.  
 (80-87.) 947 at  $8\frac{1}{4}$ d.,  $8\frac{1}{2}$ d.,  $8\frac{3}{4}$ d., 9d.,  $9\frac{1}{4}$ d.,  $9\frac{3}{4}$ d., 10d.  
 (88-94.) 801 at  $10\frac{1}{4}$ d.,  $10\frac{1}{2}$ d., 11d.,  $11\frac{1}{4}$ d.,  $11\frac{1}{2}$ d.,  $11\frac{3}{4}$ d., 1s.

### Exercise 45.

Find the cost of—

- (1-9.) 997 at 10s., 5s., 3s. 4d., 6s. 8d., 4s., 2s. 6d., 1s. 8d.,  
 2s., and 1s.  
 (10-18.) 799 at 16s. 8d., 12s. 6d., 7s. 6d., 13s. 4d., 14s., 15s.,  
 18s., 19s., and 17s. 6d.  
 (19-25.) 897 at 1s.  $4\frac{1}{2}$ d., 2s.  $3\frac{1}{4}$ d., 3s.  $6\frac{3}{4}$ d., 4s.  $4\frac{1}{2}$ d., 5s.  $10\frac{3}{4}$ d.,  
 8s.  $4\frac{1}{2}$ d., 11s.  $3\frac{1}{4}$ d.  
 (26-34.) 897 at 10s., 5s., 3s. 4d., 6s. 8d., 4s., 2s. 6d., 1s. 8d.,  
 2s., and 1s.  
 (35-43.) 783 at 16s. 8d., 12s. 6d., 7s. 6d., 13s. 4d., 14s., 15s.,  
 18s., 19s., and 17s. 6d.  
 (44-51.) 945 at 1s.  $4\frac{1}{2}$ d., 2s.  $3\frac{1}{4}$ d., 3s.  $6\frac{3}{4}$ d., 4s.  $4\frac{1}{2}$ d., 5s.  $10\frac{3}{4}$ d.,  
 8s.  $4\frac{1}{2}$ d., 11s.  $3\frac{1}{4}$ d., and 12s.  $9\frac{3}{4}$ d.  
 (52-60.) 973 at 10s., 5s., 3s. 4d., 6s. 8d., 4s., 2s. 6d., 1s. 8d.,  
 2s., and 1s.  
 (61-69.) 495 at 16s. 8d., 12s. 6d., 7s. 6d., 13s. 4d., 14s., 15s.,  
 18s., 19s., and 17s. 6d.  
 (70-77.) 681 at 1s.  $4\frac{1}{2}$ d., 2s.  $3\frac{1}{4}$ d., 3s.  $6\frac{3}{4}$ d., 4s.  $4\frac{1}{2}$ d., 5s.  $10\frac{3}{4}$ d.,  
 8s.  $4\frac{1}{2}$ d., 11s.  $3\frac{1}{4}$ d., and 12s.  $9\frac{3}{4}$ d.

### Exercise 46.

Find the price of—

| yards.         | s.              | d.      | yards.          | s.              | d.      |
|----------------|-----------------|---------|-----------------|-----------------|---------|
| (1.) 8435 at 1 | $2\frac{1}{4}$  | a yard. | (8.) 4175 at 2  | 4               | a yard. |
| (2.) 1864 at 1 | $3\frac{1}{2}$  | "       | (9.) 5670 at 2  | $9\frac{3}{4}$  | "       |
| (3.) 3655 at 1 | 4               | "       | (10.) 6085 at 2 | 11              | "       |
| (4.) 6218 at 1 | $5\frac{1}{2}$  | "       | (11.) 7104 at 3 | 3               | "       |
| (5.) 5438 at 1 | $7\frac{1}{2}$  | "       | (12.) 6750 at 3 | $10\frac{1}{2}$ | "       |
| (6.) 7590 at 1 | $10\frac{1}{2}$ | "       | (13.) 6780 at 4 | $6\frac{3}{4}$  | "       |
| (7.) 8400 at 1 | 11              | "       | (14.) 8140 at 5 | 10              | "       |

**Exercise 48.**

**Find the price of—**

- (1.)  $499\frac{1}{10}$  articles at 17s. 8d. each.
- (2.)  $965\frac{3}{10}$  articles at 18s. 2d. each.
- (3.)  $567\frac{9}{10}$  articles at 19s. 6d. each.
- (4.)  $876\frac{1}{12}$  articles at 20s. 10d. each.
- (5.)  $580\frac{5}{12}$  articles at 21s. 5d. each.
- (6.)  $654\frac{7}{12}$  articles at 22s. 6d. each.
- (7.)  $768\frac{1}{2}$  articles at 23s. 4d. each.
- (8.)  $987\frac{3}{5}$  articles at 24s. each.
- (9.)  $492\frac{3}{15}$  articles at 25s. 6d. each.
- (10.)  $365\frac{5}{15}$  articles at 27s. 4d. each.
- (11.)  $846\frac{9}{15}$  articles at 27s. 6d. each.
- (12.)  $560\frac{1}{12}$  articles at 28s. 10d. each.
- (13.)  $489\frac{1}{8}$  articles at 29s. each.
- (14.)  $654\frac{7}{16}$  articles at 29s. 6d. each.
- (15.)  $840\frac{1}{8}$  articles at 30s. each.
- (16.) 48 articles at 10s. 6d. each.
- (17.)  $13\frac{7}{8}$  articles at 5s. 3d. each.
- (18.)  $16\frac{1}{2}$  articles at £8, 15s. each.
- (19.)  $18\frac{3}{4}$  articles at £9, 5s. 6d. each.
- (20.)  $65\frac{3}{8}$  articles at 3s. 8d. each.
- (21.)  $7\frac{7}{8}$  articles at 4s. 2d. each.
- (22.)  $112\frac{7}{15}$  yards at 3s. 9d. per yard.
- (23.)  $29\frac{1}{4}$  yards at 18s. 4d. per yard.
- (24.)  $11\frac{7}{8}$  yards at 15s. 9d. per yard.
- (25.) Find the value of  $362\frac{1}{4}$  at £3, 6s. 10d. each.
- (26.) Find the value of  $207\frac{7}{8}$  at £5, 16s.  $11\frac{1}{2}$ d. each.
- (27.) What will  $2721\frac{1}{2}$  tons cost at £35, 12s.  $10\frac{1}{2}$ d. each?
- (28.) If one barrel costs £15, 3s.  $10\frac{1}{2}$ d., what should be paid for  $394\frac{3}{4}$  barrels?
- (29.) Find the value of  $249\frac{1}{4}$  at 14s.  $10\frac{1}{2}$ d. each.
- (30.) Find the value of ten thousand and fifteen and sixths at £3, 12s.  $9\frac{1}{2}$ d. each.

Find the value of 12 tons 17 cwts. 3 qrs. at £10, 15s. p

This question may be done either of two ways:—

(1) If a ton cost £1, a cwt. will cost 1s., and a qr. will 3d. Therefore, if we multiply £1 by 12, and 1s. by

3d. by 3, and add the three results together, we will get the cost of 12 tons 17 cwts. 3 qrs. at £1 per ton.

|   |                              |
|---|------------------------------|
| $\begin{array}{r} 12 & 17 & 3 \\ - & 1 & 1 \\ \hline 12 & 17 & 9 \\ & - & 10 \\ \hline & & 9 & 9 \end{array}$ | = cost at £1 per ton.        |
| $\begin{array}{r} 128 & 17 & 6 \\ - & 6 & 8 & 10\cdot 5 \\ \hline 128 & 10 & 9 & 5\cdot 25 \end{array}$       | = cost at £10 per ton.       |
| $\begin{array}{r} 138 & 10 & 9 & 75 \\ - & 10 & 0 & 0 \\ \hline 138 & 10 & 9 & 75 \end{array}$                | = cost at £10, 15s. per ton. |

|                                     |      |    |                 |                                       |
|-------------------------------------|------|----|-----------------|---------------------------------------|
| (2)                                 | £10  | 15 | 0               | = price of 1 ton.                     |
|                                     |      |    | 12              |                                       |
| 10 cwts. = $\frac{1}{2}$ ton        | £129 | 0  | 0               | = price of 12 tons.                   |
| 5 cwts. = $\frac{1}{2}$ of 10 cwts. | 5    | 7  | 6               | = 10 cwts.                            |
| 2 cwts. = $\frac{1}{5}$ of 10 cwts. | 2    | 13 | 9               | = 5 cwts.                             |
| 2 qrs. = $\frac{1}{4}$ of 2 cwts.   | 1    | 1  | 6               | = 2 cwts.                             |
| 1 qr. = $\frac{1}{2}$ of 2 qrs.     | 0    | 5  | 4 $\frac{1}{2}$ | = 2 qrs.                              |
|                                     | 0    | 2  | 8 $\frac{1}{2}$ | = 1 qr.                               |
|                                     | £138 | 10 | 9 $\frac{3}{4}$ | = price of 12 tons 17<br>cwts. 3 qrs. |

The first method is generally the most convenient, except in such questions as the following:—Find the value of 1 cu. yard 19 cu. feet, 432 cu. inches at £7, 4s. per cubic foot, where the second method should obviously be adopted. The cu. yard must be brought to cu. feet, as we are given the price of a cubic foot. We, therefore, multiply £7, 4s. by 46, and 432 is the £ of 1728.

*It is very important to notice carefully whether the price is per ton, per lb., per yard, &c.*

### Exercise 49.

Find the price of—

- (1.) 5 tons 12 cwts. 2 qrs. at £3, 6s. 8d. per ton.
  - (2.) 22 tons 8 cwts. 1 qr. at £35, 15s. per ton.
  - (3.) 20 tons 17 cwts. 2 qrs. at £11, 4s. per ton.
  - (4.) 4 tons 11 cwts. 1 qr. at £5, 6s. 8d. per ton.
  - (5.) 57 tons 8 cwts. 3 qrs. at £8, 7s. per ton.

Find the price of—

- (6.) 20 tons 19 cwts. 2 qrs. at £7, 6s. per ton.
- (7.) 10 tons 15 cwts. 0 qrs. at £4, 10s. per ton.
- (8.) 13 tons 11 cwts. at £7, 15s. per ton.
- (9.) 82 tons 17 cwts. at 12s. 6d. per ton.
- (10.) 87 tons 13 cwts. at 5s. 7d. per ton.
- (11.) 29 cwts. 2 qrs. 14 lbs. at £17, 8s. 4d. per cwt.
- (12.) 37 cwts. 3 qrs. 7 lbs. at £19, 4s. 8d. per cwt.
- (13.) 4 cwts. 3 qrs. 14 lbs. at £28 per cwt.
- (14.) 12 cwts. 1 qr. 14 lbs. at 6s. 6d. per cwt.
- (15.) 17 cwts. 0 qrs. 21 lbs. at 21s. 4d. per cwt.
- (16.) 37 cwts. 1 qr. 7 lbs. at £1, 12s. 6d. per cwt.
- (17.) 13 cwts. 1 qr. 7 lbs. at 28s. per cwt.
- (18.) 35 cwts. 3 qrs. 12 lbs. at 85s. per cwt.
- (19.) 11 cwts. 3 qrs. 8 lbs. at £3, 4s. 6d. per cwt.
- (20.) 14 cwts. 2 qrs. 16 lbs. at 17s. 6d. per cwt.
- (21.) 17 cwts. 1 qr. 19 lbs. at £1, 5s. 2d. per cwt.
- (22.) 19 cwts. 3 qrs. 11 lbs. at £2, 9s. 8d. per cwt.
- (23.) 37 cwts. 3 qrs. 2 lbs. at £3, 14s.  $7\frac{1}{2}$ d. per cwt.
- (24.) 54 cwts. 1 qr. 18 lbs. at £2, 3s. per cwt.
- (25.) 67 cwts. 3 qrs. 12 lbs. at £2, 14s. 10d. per cwt.
- (26.) 76 cwts. 2 qrs. 9 lbs. at 86s. 6d. per cwt.
- (27.) 87 cwts. 1 qr. 11 lbs. at 84s. per cwt.
- (28.) 198 cwts. 27 lbs. at £4, 17s. 6d. per cwt.
- (29.) 18 cwts. 1 qr. 5 lbs. at 1s.  $2\frac{1}{2}$ d. per lb.
- (30.) 11 cwts. 3 qrs. 17 lbs. at 1s.  $4\frac{1}{2}$ d. per lb.
- (31.) 97 acres 3 rds. 30 pers. at £10, 10s. per ac.
- (32.) 70 acres 2 rds. 25 pers. at £4, 16s. per ac.
- (33.) 44 acres 2 rds. 25 pers. at £111, 13s. 3d. per ac.
- (34.) 76 acres 1 rd. 25 pers. at £1, 11s. 6d. per ac.
- (35.) 9 acres 3 rds. 19 pers. at £2, 10s. per acre.
- (36.) 38 acres 0 rds. 30 pers. at £1, 18s. 9d. per ac.
- (37.) 1 acre 1 rd. 1 per. at £1 per ac.
- (38.) 10 acres 2 rds. 20 pers. at 15s. per ac.
- (39.) 913 acres 3 rds. 36 pers. at £1, 5s.  $8\frac{1}{2}$ d. per ac.
- (40.) 20 acres 0 rds. 20 pers. at £2, 17s. per ac.
- (41.) 2 acres 3 rds. 7 pers. at £17, 2s. 1d. per ac.
- (42.) 16 acres 3 rds. 35 pers. at £7, 16s. 8d. per ac.
- (43.) 618 acres 36 pers. at £9, 7s. 6d. per ac.
- (44.) 18 acres 2 rds. 25 pers. at £5, 8s. 8d. per ac.
- (45.) 170 ozs. 7 dwts. 15 grains at £3, 5s. 6d. per oz.
- (46.) 120 ozs. 13 dwts. 13 grains at £3, 17s. 9d. per oz.
- (47.) 115 ozs. 13 dwts. 17 grains at £1 per oz.
- (48.) 32 ozs. 13 dwts. 16 grains at £1, 18s. 9d. per oz.
- (49.) 54 ozs. 0 dwts. 5 grains at £3, 17s. per oz.

the price of—

- zs. 3 dwts. 19 grains at 18s. 6d. per oz.
- zs. 19 dwts. 19 grains at 13s. 4d. per oz.
- zs. 12 dwts. 11 grains at £5, 10s. 6d. per oz.
- zs. 19 grains at £13, 10s. per oz.
- zs. 8 dwts. 2 grains at 15s. 6d. per oz.
- ds. 3 qrs. 2 nls. at 5s. 3d. per yd.
- yds. 2 qrs. 1 nl. at £3, 15s. 9d. per yd.
- ds. 1 qr. 3 nls. at £1, 13s. 4d. per yd.
- ds. 0 qrs. 2 nls. at 16s. 8d. per yd.
- ds. 3 qrs. 3 nls. at £3, 13s. 9d. per yd.
- ds. 3 nls. at 17s. 9½d. per yd.
- galls. 2 qts. 1 pint at £2, 5s. 9d. per gall.
- galls. 1 qt. 1 pint at £1, 10s. per gall.
- galls. 1 qt. 1 pint at 19s. 6d. per gall.
- miles 7 fur. 35 per. at £7, 12s. per mile.
- miles 6 fur. 39 per. at £5, 8s. per mile.
- miles 5 fur. 10 per. at £8, 16s. per mile.
- miles 3 fur. 37 per. at £50, 8s. per mile.
- miles 2 fur. 15 per. at £12, 8s. 6d. per mile.
- miles 5 fur. 27 per. at £4, 4s. per furlong.
- miles 6 fur. 16 per. at £7, 8s. per mile.

## BILLS OF PARCELS.

questions should be written out in the following

*New Street, Birmingham,  
December, 1878.*

THOMSON, Esq.,

Bought of IRELAND & Co.

|                                   | £ | s. | d. |
|-----------------------------------|---|----|----|
| tea at 3s. 8d. per lb.,           | - | -  | -  |
| of cheese at 9d. per lb.,         | - | -  | -  |
| of moist sugar at 4½d. per lb.,   | - | -  | -  |
| loaf sugar at 5½d. per lb.,       | - | -  | -  |
| weighing 19 lbs., at 1s. per lb., | - | -  | -  |

### Exercise 50.

Make out bills of the following, supplying names and dates:—

- (1.) 7½ yds. of cloth at 3s. 6d. per yd.  
15 umbrellas at 7s. 8½d. each.  
72 collars at 5½d. each.
- (2.) 9 lbs. of mutton at 9½d. per lb.  
11 lbs. of veal at 9½d. per lb.  
½ lb. of suet at 7½d. per lb.  
1 tongue at 3s. 4d.
- (3.) 23 yds. of deal at 3½d. per foot.  
34 ft. of deal at 2½d. per foot.  
73 hours' wages at 6½d. per hour.
- (4.) 5 qrs. 4 bus. of corn at 50s. per bus.  
90½ ozs. of soda at 1s. 4d. per lb.  
67 pecks of potatoes at 2s. 6d. per peck.  
4½ lbs. of rice at 3½d. per lb.
- (5.) 13½ yds. of calico at 9d. per yd.  
8 pairs of socks at 1s. 6½d. per pair.  
4½ yds. of ribbon at 9d. per yd.  
2½ dozen collars at 6½d. each.
- (6.) 6 chickens at 2s. 9d. each.  
5½ dozen eggs at 1s. 3d. per dozen.  
26½ lbs. of cheese at 7½d. per lb.  
14 lbs. of butter at 1s. 4d. per lb.
- (7.) 8 dozen razors at 17s. 3d. per dozen.  
3 dozen razors at 1s. 1d. each.  
78 knives at 37s. per dozen.  
17 gimlets at 5½d. each.
- (8.) 21 lbs. of butter at 1s. 2½d. per lb.  
63 eggs at 8d. per dozen.  
11 fowls at 3s. 6d. per couple.  
3 geese at 8s. 2d. each.
- (9.) 7 pairs of blankets at 18s. 6d. per pair.  
37 yards of calico at 9½d. per yard.  
2½ doz. pairs of stockings at 2s. 11d. per  
10 pairs of gloves at 1s. 10½d. per pair..

## MISCELLANEOUS QUESTIONS

## Exercise 51.

- Find the price of 257 barrels at £1, 17s. 9d. per barrel.  
 What is the cost of 903 things at 3s. 4d. each?  
 Find the value of 355 articles at £1, 16s. 8d. each.  
 Find the cost of 339 sheep at £1, 9s. 6d. each.  
 Find the value of 23 cwts. 1 qr. 23 lbs. at £3, 18s. 9d. per cwt.  
 Find the rent of 39 acs. 2 rds. 18 per. at £2, 5s. per ac.  
 Find the cost of 7 cwts. 3 qrs. 26 lbs. at £1, 10s. 4d. per cwt.  
 Find the rent of 3 acs. 3 rds. 25 per. at £120 per acre.  
 What is the value of 5 cwts. 3 qrs. 19 lbs. at £2, 15s. per cwt.?  
 Find the rent of 279 acs. 3 rds. 36 per. at £2, 11s. 8d. per ac.  
 What is the cost of 27 cwts. 3 qrs. 6 lbs. at £22, 8s. per cwt.?  
 What is the price of a silver bowl weighing 68 ozs. 9 dwts. at 5s. 10d. per oz.?  
 Find the value of 157 mls. 3 fur. 24 per. of telegraph wire at £11, 10s. per mile.  
 Find the value of a nugget of gold weighing 47 ozs. 18 dwts. 4 grs. at £3, 17s. 6d. per oz.  
 Find the value of 17 acs. 2 roods 25 per. at £76, 10s. per acre.  
 Find the cost of 6 tons 11 cwts. 1 qr. at £7, 14s. 6d. per ton.  
 What is the value of 5 tons 13 cwts. 1 qr. at 5 guineas per ton?  
 What is the rent of 40 acs. 3 roods 12 per. at £7, 10s. per acre?  
 Find the value of  $784\frac{1}{2}$  sheep at £2, 12s. 10d. each.  
 What is the value of  $527\frac{1}{2}$  yds. at 16s. 3d. per yd.?  
 Find the cost of  $1530\frac{1}{2}$  articles at 15s. 9d. each.  
 What is the price of  $1466\frac{1}{2}$  things at £1, 9s. 4d. each?  
 Find the cost of 107 cwt. 3 qrs. 14 lbs. at £2, 17s. per cwt.  
 Find the whole cost of 4 dozen articles at 3 for 2d., 5 dozen at 5 for 2d.  
 Find the whole cost of 32 ozs. at  $4\frac{1}{2}d.$  per oz., 20 ozs. at  $5\frac{1}{2}d.$  per oz., and 6 ozs. at 3d. per oz.  
 Reduce 2840 sq. per. to sq. yards.

- (27.) How many men will do as much work in 4 days as 12 men will do in 24 days?
- (28.) Find the missing term in the following proportion:—  
 $\frac{?}{?} : 3 \text{ qts. } 1 \text{ pt.} :: 8\text{s. } 4\text{d.} : 2\frac{1}{2}\text{d.}$
- (29.) Divide .62 by .062.
- (30.) If 8 doz. 2 bottles cost £12, 5s., find the cost of 33 doz. 6 bottles.
- (31.) Reduce 1694 sq. yards to sq. per.
- (32.) Find the total cost of:—  
 $4\frac{1}{2} \text{ lbs. at } 4\frac{1}{2}\text{d. per lb.}$   
 $8\frac{1}{2} \text{ lbs. at } 1\frac{1}{2}\text{d. per lb.}$   
 $9\frac{1}{4} \text{ lbs. at } 4\text{d. per lb.}$
- (33.) How much is  $\frac{1}{2}$  less than  $\frac{1}{2}$ ?
- (34.) Multiply .0574 by .0065.
- (35.) How much land could be rented for £80, 11s. 8d. at the rate of £40, 5s. 10d. for 62 aca. 2 rds. 20 per?
- (36.) How many spoons, each weighing 9 dwts. 3 grs., could be made out of 3 lbs. 8 ozs. 5 dwts. 3 grs.?
- (37.) The first term of a proportion is 60 yds., the third is £56, 8s. 9d., and the fourth is £903; find the second term.
- (38.) The divisor is 826, the quotient is 301, and the dividend is 248627; find the remainder without going through the division.
- (39.) How often is  $2\frac{1}{2}$  stones contained in 2 tons?
- (40.) Define (1) Ratio, and (2) Proportion.
- 

EXAMINATION EXERCISES FOR V<sup>2</sup>

## SET I.

## A.

- (1.) Find the sum of  $\frac{8}{25}$  and  $\frac{4}{15}$ .
- (2.) Reduce 1273 inches to perches.
- (3.) If 5 yards of cloth cost 16s. 8d., how many yards could be bought for £5?
- (4.) A man owes £3952, his assets are £494; how much must he pay in the £?
- (5.) Find by Practice the cost of 14 ac. 1 rd. 16 per. at 18s. 4d. per acre.
- (6.) Reduce 705 sq. perches to sq. yards.

## B.

- (1.) A bankrupt's debts amount to £11,724 and his assets to £56, 19s. 10d.; how much in the £ can he pay?
- (2.) If I lend a friend £350 for 52 days, how long ought he to lend me £280 in return?
- (3.) Divide  $(16\frac{1}{2} + 2\frac{1}{2})$  by  $188\frac{1}{3}$ .
- (4.) Find how often  $\frac{8}{15}$  of 2s. 6d. is contained in £75.
- (5.) Reduce 2047320 sq. feet to acres.
- (6.) Divide .00735 by 3.102 to six decimal places.

## C.

- (1.) If a clerk has £73 a year, what has he per day?
- (2.) If 52 ozs. cost 8s., how much would  $3\frac{1}{4}$  ozs. cost?
- (3.) Find by Practice the price of 13 ozs. 11 dwts. 12 grs. at 3s. 9d. per oz.
- (4.) Multiply .06 by .006.
- (5.) Find the price of 3 qts. 1 pint at 4s.  $5\frac{1}{2}$ d. per quart.
- (6.) Reduce  $6\frac{1}{2}$ d. to the decimal of 1s.

## D.

- (1.) Multiply .0018 by 1.6.
- (2.) Find price of 18 cwts. 2 qrs. 7 lbs. at £7, 12s. 6d. per cwt.
- (3.) Reduce 456,756 yards to perches.
- (4.) A school opens at half-past nine o'clock and goes on for 5 hours, when does it close?
- (5.) Reduce 21,600 seconds to hours.
- (6.) Multiply 3.7 by 4.73, and divide the result by .04 to two decimal places.

## E.

- (1.) Reduce 8s.  $6\frac{1}{2}$ d. to the decimal of £1.
- (2.) Add together  $4\frac{5}{6}$ ,  $6\frac{1}{2}$ , and  $\frac{5}{8}$ .
- (3.) If 400 qrs. cost 15s., how much will 45 qrs. cost?
- (4.) Multiply  $.017 \times .00017 \times .0039$ .
- (5.) Divide 24 days 14 hrs. 39 mins. 12. secs. by 12.
- (6.) How often is  $2\frac{1}{2}$  stones contained in 1 ton?

## F.

- (1.) Reduce 789 ozs. (Avoir.) to ozs. (Troy).
- (2.) Reduce 725 Irish acres to English acres, &c.
- (3.) A bankrupt's debts amount to £2363, 5s., and his assets amount to £590, 16s. 3d.; how much can he pay in the £?
- (4.) Add  $\frac{3}{8}$  of 2s. 6d. to the  $\frac{7}{8}$  of 10s.
- (5.) If 1 lb. cost 8s. 9d., what should be the price of 84 lbs.?
- (6.) Divide .01 by .5.

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3

- (1) A man has 12 lbs. of gold; if 7 cwt. cost  
     12s. 6d. per cwt., what would 35 $\frac{1}{2}$  yards cost?  
     (2) A man bought 12 lbs. of gold at 12s. 6d. per cwt. and bought 17 st.  
     12 lbs. of silver at 10s. per lb. Was his purse increased or  
     diminished?

3

- (1) Silver costs 12s. per oz.; 1 oz. of gold; 1 lb. of  
     gold costs 12s. per oz. How many oz. of gold cost 12s. 6d.  
     (2) If 1 mina = 10 seca. How many seca. are there in 12 mina.  
     (3) How many acres are there in 1 English mile?  
     (4) Find the price of 12 lbs. of silver at 12s. 6d. per oz.  
     (5) Find the price of 12 lbs. of gold at 12s. 6d. per oz.

- (1) Find the price of 22 lbs. 13 dwts. 16 grs. at  
     12s. 6d. per oz.
- (2) How many acres are there in 12 mina 10 seca?
- (3) Find the price of 12 lbs. of gold at 12s. 6d. per oz.
- (4) Find the price of 12 lbs. of silver at 12s. 6d. per oz.

3

- (1) Find by division the price of 53 lbs. 3 dwts. 12 grs. at  
     12s. 6d. per oz.
- (2) Reduce 12 lbs. 10 oz. to the decimal of a lb.
- (3) A number of men can do a piece of work in 20 days of 8 hrs. each; in how many days will they do it when working 9 hrs. a day?
- (4)  $\{ \times \} \times 3 \frac{1}{2} \times 10$ .
- (5) Find the missing term in the following proportion:—  
 $1 : 4 \text{ yds.} :: 5 \frac{1}{2} \text{ d.} : ? \text{ s. } 9 \text{ d.}$
- (6) If 24 horses plough a field in  $8\frac{1}{2}$  days, how many horses  
     will do it in 18 days?

EXAMINATION EXERCISES.

K.

- (1.) Find by practice the value of 6 tons 13 cwts. 3 qrs. 20  
at 4s. 9½d. per cwt.
- (2.) Reduce 4774 lbs. to tons.
- (3.) If 7 cwts. 1 qr. 7 lbs. cost 31s. 7d., what weight can  
be bought for 41s. 4d.?
- (4.) Find the whole cost of 6½ lbs. at 4½d., and 4½ lbs. at 4d.
- (5.) The product of two factors is .00207; one of the factors  
.009, find the other.
- (6.) Find the price of 1 yd. 3 qrs. 2 nls. at £1, 5s. per yd.

L.

- (1.) Reduce 3846 sq. yards to acres.
- (2.) Find the missing term:—  
3 tons 1 cwt. : ? :: £420 : £20, 10s.
- (3.) Find the value of 846  $\frac{9}{16}$  articles at £1, 7s. 6d. each.
- (4.)  $34 \times 5$ .
- (5.) Find the price of 18 lbs. 2 ozs. 10 dwts. at 8s. 9d. per  
lb.
- (6.)  $(2\frac{1}{2} \div \frac{1}{3}) + (3\frac{1}{3} \div 1\frac{1}{3})$ .

M.

- (1.) Find the price of 87  $\frac{5}{12}$  articles at £8, 15s. each.
- (2.)  $7 \cdot 009 \times 15 \cdot 06$ .
- (3.)  $3\frac{1}{2} + 4\frac{2}{3} + 5\frac{3}{4} + 27\frac{5}{6}$ .
- (4.) How often is 2 yds. 2 ft. 9 ins. contained in 4 mls. 7 ft.
- (5.) A man can walk  $\frac{2}{3}$  of his journey in 8 hrs., how long will it take him to go  $\frac{4}{5}$  of his journey?
- (6.) Divide  $(\frac{7}{15} + \frac{2}{3} + 5\frac{2}{3})$  by  $\frac{1}{2}$ .

N.

- (1.) Find the value of .06875 of a ton.
- (2.) Convert the following into decimals:— $\frac{3}{8}, \frac{5}{7}, \frac{3}{15}$ .
- (3.) Find the value of 34 ozs. 12 dwts. 14 grs. at £1, 11s.  
per oz.
- (4.) Divide 3·007 by .0028.
- (5.) From  $\frac{4}{5} \times \frac{2}{7}$  take  $\frac{1}{3}$  of  $\frac{2}{7}$ .
- (6.) A bankrupt pays 2s. 3d. in the £, and pays £112, 10s.  
to his creditors. Find the amount of his debts.

O.

- (1.) How many bottles, each holding a pint and a half, can  
be filled out of 57 gallons?
- (2.) Find the difference between .007 and 3·6.

- (3.) Divide the difference between .4 and .075 by .025.  
 (4.) 17 days 15 hrs. 20 mins. 21 secs.  $\div$  9.  
 (5.) Divide .00486 by 213.6.  
 (6.) If the divisor be  $\frac{1}{3}$ , and the quotient  $3\frac{1}{3}$ , what is the dividend?

## P.

- (1.) Express 1 yr. 12 weeks as the fraction of 12 yrs.  
 (2.) Express to 4 decimal places a day as the decimal of a year.  
 (3.) Subtract  $\frac{1}{4}$  of a ton from 35 cwts.  
 (4.) How many coats, each containing  $2\frac{3}{5}$  yards, could be made out of  $137\frac{1}{3}$  yards?  
 (5.) Express  $\frac{2}{3}$  of  $\frac{1}{5}$  of 12 acres as the fraction of 33 sq. yards.  
 (6.) Divide the difference between  $1\frac{1}{2}$  and  $\frac{2}{3}$  by the product of  $1\frac{1}{2}$  and  $\frac{5}{6}$ .

## Q.

- (1.) The product of two numbers is  $56\frac{2}{3}$ , and one of the numbers is  $12\frac{1}{3}$ ; find the other.  
 (2.) 4685 years  $2\frac{3}{7}$  days 10 hrs. 16 mins.  $\div$  34.  
 (3.) Find the value of £012365.  
 (4.)  $4\frac{1}{4} - 3\frac{1}{8}$ .  
 (5.) Find the value of  $1\frac{1}{5}$  of a day.  
 (6.) Find the cost of  $\frac{7}{8}$  yard at £ $\frac{7}{8}$  per yard.

## R.

- (1.) Reduce  $\frac{5}{6}$  of a florin to the fraction of 2s. 6d.  
 (2.) Divide 5 by .005.  
 (3.) Find value of 290 cwt. 2 qrs. 10 lbs. at 15s. per cwt.  
 (4.) Find the product of  $2\frac{1}{2}$  and  $1\frac{1}{8}$ .  
 (5.) Reduce  $5\frac{2}{3}$  to an improper fraction.  
 (6.) Find the income-tax on £2229 at 6d. in the £.

## S.

- (1.) Find the value of .09375 of a ton.  
 (2.) Find by Practice the cost of 45 yards 3 qrs. 2 nails at 5s. per yard.  
 (3.) How many English acres in a farm containing  $10\frac{1}{2}$  Irish acres?  
 (4.) If 1 cwt. cost £1, 17s. 6d., find the cost of 53 cwt. 1 qr. 21 lbs.  
 (5.) Find the product of 1538 and 1.072.  
 (6.) Express 2s. 6d. to the decimal of a £1.

## T.

- (1.) Divide 24·006 by 27·05.
  - (2.) Find the cost of 43 ac. 2 rds. 34 pers. at £2, 11s. 3d. per acre.
  - (3.) If  $\frac{2}{3}$  yard cost 5s., what will 10 $\frac{1}{2}$  yards cost?
  - (4.) If 30 men do a piece of work in 10 days, how long would it take 20 men to do the same work?
  - (5.) Find the cost of 1 lb. 10 ozs. 10 dwts. 4 grs. at 5s. 6d. per oz.
  - (6.) Reduce 1s. 4 $\frac{1}{2}$ d. to the fraction of 10s.
- 

## SET II.

## A2.

- (1.) The divisor is £1, 11s. 6d., the quotient is 9, and the remainder 1 $\frac{1}{2}$ d.; find the dividend.
- (2.) If 15 men build a wall in 12 days, how many men could build it in 10 days?
- (3.) Find by Practice the cost of 3 tons 16 cwts. 3 qrs. at £1, 10s. per ton.
- (4.) Divide 3·03 by .003.
- (5.) Divide 12 by  $\frac{5}{8}$ .

## B2.

- (1.) Multiply 17629493 by 2070.
- (2.) Find the missing term in the following Proportion:—  
40 : ? :: 6 acs. 2 rds. : 18 acs. 2 rds.
- (3.) Find by Practice the price of 120 ozs. 13 dwts. 13 grs. at £5, 17s. 9d. per oz.
- (4.) Take .805 from 2·05.
- (5.) Find the price of 31 yards 1 qr. 2 nails at £1, 5s. per yard.

## C2.

- (1.) £320, 16s. 8d.  $\times$  920.
  - (2.) If 139 acs. 3 rds. 39 pers. cost £1, 2s. 6d., what would 60 acres cost?
  - (3.) Find the value of 3 $\frac{1}{2}$  yards at 1 $\frac{1}{4}$ d. per yard.
  - (4.) Simplify  $\frac{45\cdot655 + .0141}{.05 - .046787}$ .
  - (5.) Reduce 5s. 8 $\frac{1}{2}$ d. to the decimal of £1.
-

## D2.

- (a) If the dividend is 7, and the quotient £8, 3s. 1*½*d., find the dividend.  
 (b) If an Avondupois pound cost £4, 10s. 6*½*d., what would 9 lbs. (Pewt.) cost?  
 (c) Find the cost of 3 cwt. 1 qr. 14 lbs. 14 ozs. at £2, 5s. 4*½*d. per cwt.  
 (d) Give the Rule for dividing one vulgar fraction by another.  
 (e) Add together  $\frac{2}{3}, \frac{1}{4}, \frac{3}{5}, \frac{1}{6}$ .

## E2.

- (a) From 10,980 take 1,878.  
 (b) Find the cost of  $\frac{3}{4}$  lbs. if  $2\frac{1}{2}$  lbs. cost 1s. 8d.  
 (c) Find by Practice the cost of 37 cwt. 2 qrs. 14 lbs. at 2s. 6*½*d. per cwt.  
 (d) From  $2\frac{1}{2}$  take  $\frac{3}{4}$ .  
 (e) Reduce 21,120 feet to miles.

## F2.

- (a) Reduce 1 under 4 far. 96 pers. 3 yards to feet.  
 (b) If 0.1 lbs. of butter cost 8s. 9d., what would 1 cwt. 3 qrs. cost?  
 (c) Find by Practice the cost of 170 cwt. 3 qrs. 14 lbs. at 2s. 6*½*d. per lb.  
 (d) Subtract  $\frac{1}{3}$  from 14.  
 (e) Find by Practice the cost of 11,111*½* articles at 6s. 10*½*d. each.

## G2.

- (a) Find the product of  $\frac{1}{3}, \frac{2}{5}, \frac{3}{4}, 3\frac{1}{2}$ , and 6.  
 (b) Find by Practice the value of 249 articles at £11, 17s. 6*½*d. each.  
 (c) Make out a bill for

$7\frac{1}{2}$  dozen at 4s. 7*½*d. each.  
 68 yards at 4s. 7*½*d. per yard.  
 $9\frac{1}{2}$  gallons at 4s. 9d. per gallon.  
 $15\frac{1}{2}$  yards at 7s. 8d. per yard.

- (d) From  $3\frac{1}{2} + 2\frac{1}{2}$  take  $4\frac{1}{2} - 6\frac{1}{2}$ .  
 (e) If in 24 days 66 men do a piece of work, how many men would be required if 3*½* were allowed?

## H 2.

- (1.) Find the price of 316 cwts. at £9, 13s. 8d. per cwt.
- (2.) If 90 men take 100 days to build a wall, how many men would be required to do it in 60 days?
- (3.) Multiply  $2\frac{2}{3}$  of  $1\frac{1}{4}$  by  $\frac{4}{5}$  of  $\frac{9}{16}$ .
- (4.) A traveller who can go 24 miles a day completed a journey in 35 days, how long would he have taken going 20 miles a day?
- (5.) Find by Practice the value of 2220 yards at 5 $\frac{3}{4}$ d. per yard.

## I 2.

- (1.) How far can 48 tons be carried for the money paid for carrying 36 tons 144 miles?
- (2.) Divide  $\frac{2}{3}$  of 18 by  $\frac{1}{5}$ .
- (3.) Find by Practice the value of 1675 articles at £18, 18s. 9d. each.
- (4.) Multiply 13 tons 13 cwts. 0 qrs. 13 lbs. by 679, and divide the result by 97.
- (5.) Reduce 9107 sq. yds. to statute acres.

## J 2.

- (1.) From the sum of  $\frac{2}{3} + \frac{2}{5} + \frac{5}{6}$  take  $\frac{3}{4}$  of  $1\frac{1}{2}$ .
- (2.) Find by Practice the cost of 862 articles at £5, 16s. 10 $\frac{1}{2}$ d. each.
- (3.) If the carriage of 1 ton 1 qr. for 150 miles be £3, 9s. 4d., what weight would be carried the same distance for 8s. 8d.?
- (4.) Add together  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{3}{4}$ , and divide the result by 3.
- (5.) Multiply .0574 by .0085.

## K 2.

- (1.) Find by Practice the value of 80 articles at £12, 16s. 2d. each.
- (2.) Add  $2\frac{1}{3} + 3\frac{1}{4} + 8\frac{1}{2}$ .
- (3.) If I pay 8 $\frac{1}{2}$ d. for  $1\frac{1}{2}$  cwts. of coal, how much should I pay for 3 tons 15 cwts. 2 qrs.?
- (4.) Divide 5.05 by .05.
- (5.) Add .075 + 1.5 + 2.285 + 4.15.

## L 2.

- (1.) Add  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $2\frac{5}{12}$ , and divide the result by  $\frac{1}{3}$ .
- (2.) How many plots of 20 sq. yards are in a field of 3 acres 2 rds. 10 poles?

- (a.) Make out a bill for  $17\frac{1}{2}$  lbs. at  $7\frac{1}{2}d.$  per lb.; 2 c.  
3s. 6d. a lb.; 54 eggs at 1s. 2d. a dozen;  $2\frac{1}{4}$  lbs. at  
a lb.; and 14 lbs. at 28s. per cwt.
- (b.) Find by Practice the value of 3819 yards at £4, 1.  
each.
- (c.) Add .75, .0964, 36.2, 8.073, .66948.

## M 2.

- (1.) Add together  $2\frac{1}{2}$ ,  $1\frac{3}{4}$ ,  $3\frac{3}{8}$ , and divide the result by  $\frac{1}{4}$ .
- (2.) I bought 300 lambs for £301, 5s.; how much was the  
score?
- (3.) Reduce 2475 statute miles to yards.
- (4.) Find value of 7 cwt. 3 qrs. 7 lbs. at 5s. per cwt.
- (5.)  $1\frac{2}{5} \div \frac{2}{3}$ .

## N 2.

- (1.) Divide 32 by  $\frac{2}{3}$  of  $3\frac{1}{4}$ .
- (2.) How much sugar may be bought for £22, 15s.  $7\frac{1}{2}d.$   
the cost of 6 cwts. 1 qr. 12 lbs. is £18, 4s. 6d.?
- (3.) Find the product of  $1\frac{1}{3}$  and  $\frac{5}{6}$ .
- (4.) Subtract .815 from 2.05.
- (5.) If 5 oz. 10 dwts. cost £1, 13s., how much may be 1  
for £3?

## O 2.

- (1.) Find by Practice the value of 875 articles at £9, 16  
each.
- (2.) If 7 acres cost £8, 3s. 4d., how many can be £  
£116, 13s. 4d.?
- (3.) Divide  $\frac{1}{2}$  of  $\frac{1}{3}$  by 10.
- (4.) Reduce  $\frac{5}{6}$  to a decimal.
- (5.) Divide .016004 by .004.

## P 2.

- (1.) Find the price of 5 cwts. 3 qrs. 15 lbs. at  $2\frac{1}{4}d.$  per lb.
- (2.) Divide .006 by .06.
- (3.) Reduce  $\frac{4}{5}$  of  $1\frac{1}{3}$  cwt. to the fraction of 1 ton.
- (4.) Find the cost of 18 ozs. 10 dwts. 12 grs. at 4s.  $10\frac{1}{2}d.$
- (5.) Reduce 18 ac. statute measure to Irish.

## Q 2.

- (1.) Multiply  $(\frac{1}{2} + \frac{2}{3} + \frac{3}{4})$  by  $\frac{4}{5}$  of  $\frac{5}{6}$ .
- (2.) If one dozen pipes cost  $2\frac{1}{2}d.$ , how many will you get for £1?
- (3.) Find by Practice the value of 80 articles at £12, 1.  
each.

- (4.) Reduce  $\frac{1}{2}\frac{1}{8}$  to a decimal.  
 (5.) Add together 1·465, .0095, 37·15, 28·457, and 16·1685, and divide the result by .0296.

## R2.

- (1.) Add  $12\frac{1}{2}$ ,  $3\frac{1}{2}$ ,  $8\frac{1}{2}$ , and subtract  $14\frac{3}{8}$  from the answer.  
 (2.) Find the cost of  $572\frac{1}{2}$  articles at £3, 17s.  $11\frac{1}{2}d$ . each.  
 (3.) Make out the following bill:—19 at  $8\frac{1}{2}d$ . each; 792 at  $6\frac{1}{4}d$ . per doz.; 87 at 3 for  $5\frac{1}{2}d$ .; 95 lbs. at 1s. 7d. per lb.  
 (4.) A man's salary is £500; he spends £19, 2s. 6d. every 30 days: how much does he save in a year?  
 (5.) Reduce .125 to a vulgar fraction.

## S2.

- (1.) From  $1\frac{1}{2}$  take the sum of  $\frac{2}{3}$  and  $\frac{5}{6}$ .  
 (2.) If 80 articles cost £13, 5s. 4d., what will 40 dozen cost?  
 (3.) In 16,161 sq. yds. how many statute acres?  
 (4.) Find the price of 552 ac. 2 rds. 20 per. at £1, 3s. 8d. an acre.  
 (5.) Reduce £1, 14s. to the decimal of 8s. 4d.

## T2.

- (1.) Find by Practice the price of 3560 articles at £3, 7s.  $4\frac{1}{2}d$ . each.  
 (2.) What quantity of tea at 3s.  $4\frac{1}{2}d$ . per lb. must be given in exchange for 54 lbs. of coffee at 1s.  $7\frac{1}{2}d$ . per lb.?  
 (3.) Divide  $5\frac{1}{2}$  by  $7\frac{1}{3}$ , and subtract the result from  $9\frac{1}{2}$  of  $1\frac{3}{5}$  of  $\frac{3}{11}$ .  
 (4.) A piece of cloth containing  $17\frac{1}{2}$  yards cost £15, 12s.  $4\frac{1}{2}d$ ., find cost of  $34\frac{1}{4}$  yds.  
 (5.) How often is .0018 contained in 4·068?

## U2.

- (1.) How many seconds in a year of 365 days?  
 (2.) Divide 1·006 by 3·2.  
 (3.) Find the price of 4 acs. 2 rds. 24 per. at £2, 18s.  $6\frac{1}{2}d$ . per ac.  
 (4.) A bankrupt is worth £350 and he owes £800; how much can he pay in the £?  
 (5.) Bought 14 lbs. of meat at 10d. per lb., how much would I get for £16?

## V2.

- (1.) Reduce 8964 sq. in. to perches.  
 (2.) Find the product of .045 and .004.  
 (3.) If I bought 3 lbs. of butter for 2s. 10d., how much could I get for £1, 5s. 6d.?

- (4.) Reduce 350 acres, Irish, to English measure.  
 (5.) Find the sum of  $\frac{5}{6}$  and  $\frac{17}{35}$ .

## W2.

- (1.) Find the rent of 16 acs. 2 rds. 13 per. at 15s. per ac.  
 (2.) Find the price of 115 ozs. 13 dwts. 12 grs. at £1 per oz.  
 (3.) Add 3·07, 19·008, ·0009, 15·7.  
 (4.)  $16\frac{7}{8} + 9\frac{3}{4}$ .  
 (5.) By working 8 hours a day a number of men can reap a field in 10 days, in what time could they reap it if they worked 10 hours a day?

## X2.

- (1.) Find the whole cost of:— $5\frac{1}{2}$  lbs. at  $5\frac{1}{2}d.$  per lb.,  $3\frac{1}{2}$  lbs. at  $4\frac{1}{2}d.$  per lb.  
 (2.) Find the price of 27 yds. 1 qr. 2 nls. at £3, 5s. per yard.  
 (3.) Reduce 3s.  $8\frac{1}{2}d.$  to the decimal of £1.  
 (4.) Add together  $2\frac{1}{4}$ ,  $5\frac{3}{8}$ ,  $6\frac{5}{6}$ .  
 (5.) Reduce 38,167 feet to miles.

## Y2.

- (1.) Find the cost of  $1231\frac{1}{6}$  articles at 6s.  $7\frac{1}{2}d.$  each.  
 (2.) If 3 men could do a piece of work in 27 days, how many men could do it in 9 days?  
 (3.) Find the difference between  $1\frac{1}{2}$  and  $1\frac{7}{10}$ .  
 (4.) Subtract ·815 from 2·05.  
 (5.) If 3 ozs. 10 dwts. of silver be bought for £1, 10s. how much may be bought for £30?

## Z2.

- (1.) From 2·43 take  $1\frac{3}{5}$ .  
 (2.) If 10 stone of flour cost £1, find the cost of 3 tons 10 cwts.  
 (3.) Reduce 1 acre, English, to Irish measure.  
 (4.) If 13 lbs. Troy cost £17, 10s., find the price of 10 lbs. Avoirdupois.  
 (5.) A bankrupt owes £8760, and only possesses £2360; how much can he pay in the £?

THE  
IRISH SCHOOL ARITHMETIC.  
PART III.

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CIRCULATING DECIMALS.

Vulgar Fractions in their lowest terms, whose denominators contain factors other than 2's, 5's, or a combination of 2's and 5's, are not reducible to terminate decimals. For example:

- (a)  $\frac{1}{3} = \cdot333\dots$
- (b)  $\frac{1}{7} = \cdot142857142857\dots$
- (c)  $\frac{5}{6} = \cdot833\dots$
- (d)  $\frac{1}{11} = \cdot83656565\dots$

Decimals such as these, in which the same figures repeat without end, are called Circulating, Repeating or Recurring Decimals.

(a) and (b) are examples of *PURE* circulators.

(c) and (d) are examples of *mixed* circulators.

|                          |                                       |
|--------------------------|---------------------------------------|
| $\cdot333\dots$          | is written $\cdot\dot{3}$ .           |
| $\cdot142857142857\dots$ | is written $\cdot\overline{142857}$ . |
| $\cdot833\dots$          | is written $\cdot\overline{83}$ .     |
| $\cdot83656565\dots$     | is written $\cdot\overline{8365}$ .   |

To reduce a Circulating, Recurring, or Repeating Decimal to a Vulgar Fraction.

First, let the decimal be a *Pure* Circulator.

Rule:—Write down the period as numerator, and for denominator as many 9's as there are circulating figures, and reduce the fraction to its lowest terms.

Example:—Reduce  $\cdot\overline{36}$  to a vulgar fraction.

$$\cdot\overline{36} = \frac{36}{99} = \frac{4}{11}. \quad Ans.$$

Second, let the decimal be a *Mixed* Circulator.

Rule:—Subtract the non-repeating part from the whole decimal. Write down the remainder as numerator; and for denominator write



$$\begin{array}{r}
 6\cdot45\overline{7} = 6\cdot457777777\overline{7} \\
 \cdot45\overline{7} = \cdot457457457\overline{7} \\
 23\cdot45\overline{7} = 23\cdot457575757\overline{7} \\
 \hline
 30\cdot37\overline{281099} \quad \text{Ans.}
 \end{array}$$

A similar method is applied to Subtraction.

### Exercise 3.

- (1.) Add  $\overline{786}$ ,  $\overline{4}$ ,  $\overline{94873}$ , and  $\overline{7639}$ .
- (2.)  $98\cdot763 + 45\cdot9647 + 789\cdot28$ .
- (3.)  $198\cdot457 + 73\cdot96 + \overline{7} + \overline{58473}$ .
- (4.) Subtract  $\overline{69\cdot873}$  from  $\overline{490\cdot875}$ .
- (5.) From  $629\cdot87534$  take  $96\cdot8$ .
- (6.) Add  $\overline{589}$ ,  $\overline{7}$ ,  $\overline{84975}$ , and  $\overline{5693}$ .
- (7.)  $793\cdot845 + 48\cdot6937 + 456\cdot789$ .
- (8.)  $396\cdot574 + 98\cdot793 + \overline{8} + \overline{6483}$ .
- (9.) Subtract  $45\cdot976$  from  $\overline{490\cdot8753}$ .
- (10.) From  $945\cdot69374$  take  $88\cdot7$ .
- (11.) Add  $\overline{873}$ ,  $\overline{5}$ ,  $\overline{69837}$ , and  $\overline{6535}$ .
- (12.)  $769\cdot7475 + 439\cdot678 + 567\cdot893$ .
- (13.)  $456\cdot987 + 935\cdot69 + 50\cdot689$ .
- (14.) Subtract  $94\cdot783$  from  $\overline{490\cdot7863}$ .
- (15.) From  $957\cdot6198$  take  $79\cdot5$ .
- (16.) From  $\overline{974358}$  take  $\overline{6428571}$ .

### MULTIPLICATION AND DIVISION.

**Rule:**—Reduce the circulators to vulgar fractions, then perform the necessary operation, and reduce the result to decimal form.

**Example:**— $\overline{698} \times \overline{78}$ .

$$\frac{\overline{698}-6}{990} \times \frac{78}{99} = \frac{692}{990} \times \frac{\overline{78}}{99} = \frac{8996}{16335} = \frac{13}{165} = \overline{.55071\dots} \quad \text{Ans.}$$

### Exercise 4.

- |  |   |  |
|--|---|--|
| <ol style="list-style-type: none"> <li>(1.) <math>\overline{96} \times \overline{79}</math>.</li> <li>(2.) <math>\overline{69} \times \overline{97}</math>.</li> <li>(3.) <math>\overline{45} \times \overline{89}</math>.</li> <li>(4.) <math>\overline{73} \times \overline{45}</math>.</li> <li>(5.) <math>\overline{49} \times \overline{85}</math>.</li> <li>(6.) <math>\overline{93} \times \overline{74}</math>.</li> <li>(7.) <math>\overline{908} \times \overline{908}</math>.</li> <li>(8.) <math>\overline{708} \times \overline{708}</math>.</li> </ol> | <ol style="list-style-type: none"> <li>(9.) <math>\overline{698} \times \overline{698}</math>.</li> <li>(10.) <math>\overline{763} \times \overline{673}</math>.</li> <li>(11.) <math>\overline{968} \times \overline{685}</math>.</li> <li>(12.) <math>\overline{984} \times \overline{673}</math>.</li> <li>(13.) <math>\overline{684} \div \overline{97}</math>.</li> <li>(14.) <math>\overline{783} \div \overline{69}</math>.</li> <li>(15.) <math>\overline{876} \div \overline{49}</math>.</li> <li>(16.) <math>\overline{784} \div \overline{69}</math>.</li> </ol> | <ol style="list-style-type: none"> <li>(17.) <math>\overline{567} \div \overline{43}</math>.</li> <li>(18.) <math>\overline{673} \div \overline{56}</math>.</li> <li>(19.) <math>\overline{493} \div \overline{65}</math>.</li> <li>(20.) <math>\overline{693} \div \overline{45}</math>.</li> <li>(21.) <math>\overline{987} \div \overline{76}</math>.</li> <li>(22.) <math>\overline{579} \div \overline{67}</math>.</li> <li>(23.) <math>\overline{849} \div \overline{33}</math>.</li> <li>(24.) <math>\overline{298} \div \overline{33}</math>.</li> </ol> |
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#### **ANSWER**

THE QUESTIONS ON  
THE LAW OF PROPORTION.

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- acres in potatoes, and  $15\frac{3}{4}$  acres in turnips; find the whole area of his farm.
- (33.) What is the cost of  $\frac{7}{8}$  of a yard at £ $\frac{7}{8}$  per yard?
- (34.) Required the price of a yard when  $7\frac{7}{8}$  yards cost 95s. 8d.
- (35.) A shipmaster who had  $\frac{3}{4}$  share of a vessel, sold  $\frac{1}{3}$  of his share for £965, 13s. 4d.; how much is the value of the whole vessel at that rate?
- (36.) A pole stands  $\frac{1}{6}$  in the mud,  $\frac{1}{2}$  in the water, and 35 feet above the water; what is the length of the pole?
- (37.) If a man has  $24\frac{5}{8}$  bushels of corn, and he sells  $\frac{2}{3}$  of it, how much has he left?
- (38.) What is the value of  $(75\frac{2}{3} - 7\frac{5}{6}) \div \frac{7}{8} \times 3\frac{1}{3}$ ?
- (39.)  $(\frac{2}{3} \text{ of } \frac{5}{6} \text{ of } 3\frac{3}{4} + 8\frac{3}{4}) \div (10\frac{1}{2} - 7\frac{1}{2})$ .
- (40.)  $(\frac{5}{8} \text{ of } 1\frac{9}{10} \div 15) \times (15 \div \frac{3}{4} \text{ of } \frac{6}{7})$ .
- (41.)  $[(12\frac{3}{8} \div \frac{1}{12}) - (15\frac{5}{8} \times \frac{1}{3})] \times 4$ .
- (42.)  $1\frac{5}{8} \text{ of } (2\frac{2}{3} \div 6\frac{5}{8}) \times (9\frac{3}{8} \div 4\frac{2}{3})$ .
- (43.)  $\frac{12\frac{1}{2}}{\frac{2}{3} \text{ of } \frac{3}{4}}$ .
- (44.)  $\frac{2\frac{2}{3} \text{ of } \frac{5}{7}}{6\frac{2}{3} \text{ of } 1\frac{1}{10}} \div 9$ .
- (45.) Find the difference between £24, 5s.  $4\frac{3}{4}$ d.  $\times \frac{5}{2}\frac{1}{3}$  and £39, 0s. 10d.  $\div 4\frac{2}{3}$ .
- (46.) Find the value of  $1\frac{1}{2}\frac{1}{2}$  of £3, 4s. 6d.  $+ 7\frac{1}{2}$  of  $3\frac{1}{2}$  guineas  $+ 1\frac{2}{3}d$ .
- (47.) Express  $\frac{2}{5}$  of  $3\frac{1}{3}$  of £1, 11s. 6d. as the fraction of £3.
- (48.) Reduce  $\frac{\frac{1}{2} + \frac{2}{3} + \frac{3}{5} + \frac{7}{15}}{\frac{1}{2} + \frac{2}{3} + \frac{7}{8} + \frac{1}{16}}$  to its simplest form.
- (49.) Simplify  $\frac{320}{960} + \frac{85}{187} + \frac{11}{17} - \frac{1}{2}$ .
- (50.) Reduce  $1\frac{5}{8} - 1\frac{1}{5} + \frac{2}{3} - \frac{7}{10}$  to a simple fraction.
- (51.) Simplify  $(\frac{2}{3} - \frac{2}{5} + \frac{1}{8} - \frac{1}{10} + \frac{1}{12}) \div (\frac{2}{3} - \frac{1}{4} + \frac{2}{5} - \frac{1}{6})$ .
- (52.) Reduce to its simplest form  $(\frac{1}{2} + \frac{1}{3} + \frac{2}{5}) \div (\frac{2}{3} \times \frac{1}{12} \times \frac{1}{5}\frac{1}{2})$ .
- (53.) Simplify  $(2\frac{1}{2} + 1\frac{3}{4} - 3\frac{3}{8}) \times \left(\frac{1}{8} \text{ of } \frac{2\frac{1}{2}}{4\frac{1}{2}}\right)$ .
- (54.) Simplify  $\frac{2\frac{1}{2} \times 1\frac{1}{2}}{\frac{3}{8} \times 1\frac{1}{17}} \div \frac{1\frac{2}{5} \times \frac{1}{12}}{1\frac{5}{8} \times 1\frac{6}{17}}$ .
- (55.) Reduce 8 lbs. 5 oz. 14 drs. to the decimal of 1 quarter.
- (56.) If 7·5 acres of land produce 192·225 bushels of wheat, how much does 1 ac. produce?
- (57.) What is the quotient when 125 is divided by 8000?
- (58.) From the sum of 256·07 and 5·0125 take their difference.
- (59.) Divide 23 by 2875.
- (60.) Find the value in decimals of  $\frac{1}{3 + \frac{1}{7 + \frac{1}{10}}}$ .
- u.) Reduce £3, 12s.  $2\frac{1}{4}$ d. to the decimal of 11 guineas.
- v.) Express as vulgar fractions in their lowest terms  $0625 \times 0032$ ;  $.016 \div .64$ ;  $.4\frac{5}{6} - .45$ .

- (63.) Divide 28413 by 0231.
- (64.) Calculate to five places of decimals  $\frac{1.492641}{71298}$ .
- (65.) Reduce 285714 and 142857 to vulgar fractions in their lowest terms.
- (66.) Reduce  $4\frac{1}{15}$  to a decimal, and 00054 to a vulgar fraction.
- (67.) What dec. of 10 ac. 2 rds.  $37\frac{1}{2}$  poles is 1 ac. 3 rds.  $37\frac{1}{2}$  poles?
- (68.) How far can I travel in a penny-a-mile train with a ticket which cost me 375 of a guinea?
- (69.) Add together 5.5 cwts. 3.125 qrs., and reduce the result to the dec. of 10,000 tons.
- (70.) What is the value of  $\frac{.035 \times .0056}{.0007}$ ?
- (71.) Find the value of 173.25 yards at 6.75d. per yard.
- (72.) A piece of cloth containing  $29\frac{1}{2}$  yards cost £15, 12s. 4 $\frac{1}{2}$ d.; what will  $34\frac{1}{2}$  yds. cost?
- (73.) A bankrupt owes £36,757, 10s., and his assets are £12,175, 18s. 5 $\frac{1}{2}$ d.; what can he pay in the £?
- (74.) A man can pay 7s. 8 $\frac{1}{2}$ d. in the £, and owes £1674, 4s.; what are his effects worth?
- (75.) If  $\frac{1}{3}$  of a ship cost £38333, 6s. 8d., find the value of 8 of it.
- (76.) If  $\frac{1}{3}$  of  $\frac{1}{4}$  of an estate be worth £2000, find the value of .045 of the estate.
- (77.) If  $\frac{21}{2}$  of  $12\frac{1}{2}$  cwts. cost £32, what is the value of  $\frac{21}{2}$  of  $12\frac{1}{2}$  cwts.?
- (78.) When £90, 7s. 6d. produces £3 interest, what must I invest to secure an income of £100 a year?
- (79.) What will 10 $\frac{1}{2}$  lbs. of salt cost when 3 $\frac{1}{2}$  cwts. cost £8, 19s. 8d.?
- (80.) What is the value of  $\frac{1}{2}$  of  $\frac{1}{3}$  of a ship when  $\frac{1}{2}$  of it sells for £525?
- (81.) How many yards of silk at 3s. 9d. per yard must be given in exchange for 53 yards at 4s. 3d. per yard?
- (82.) How much ought I to lend a friend for 5 months to pay him for lending me £50 for 1 $\frac{1}{2}$  years?
- (83.) Find the value of 5694 $\frac{1}{2}$  articles at £3, 11s. 9 $\frac{1}{2}$ d. each.
- (84.) " " 9741 $\frac{1}{2}$  " £1, 2s. 9 $\frac{1}{2}$ d. "
- (85.) " " 4627 $\frac{1}{2}$  " 19s. 10d. "
- (86.) Find the total cost of—  
 463 articles at £4, 1s. 10 $\frac{1}{2}$ d. each.  
 568 " £7, 1s. 6 $\frac{1}{2}$ d. "  
 719 " £25, 9s. 8 $\frac{1}{2}$ d. "
- (87.) Find the price of 749 $\frac{1}{2}$  cwts. at 11s. 8d. per cwt.
- (88.) " " 397 $\frac{1}{2}$  articles at £5, 10s. 0 $\frac{1}{2}$ d. each.
- (89.) " " 11,513 $\frac{1}{2}$  articles at £9, 18s. 9d. each.
- (90.) " " 1 ton 2 qrs. 20 lbs. at £9, 6s. 8d. per cwt.
- (91.) Calculate a person's wages for 5 months, 3 weeks, and 6 days, at £1, 7s. 5d. per month

- What is the cost of 3 cwts. 3 qrs. 14 lbs. at 16s. 8d. per ton?
- " " 15 cwts. 1 qr. 7 lbs. at £7, 10s. 9d. per qr.?
- " " 50 ac. 1 rd. 10 per. at £3, 7s. 4d. per ac.?
- " " 9 cwts. 3 qrs. 14 lbs. at £1, 10s. per ton?
- " " 2 ac. 3 rds. 16 po. at £24, 13s. 4*1*<sub>2</sub>d. per rd.?
- " " 13 cwts. 3 qrs. 4 lbs. at £2, 18s. 4d. per cwt.?
- " " 63 ac. 3 rds. 27 per. at 30s. per ac.?
- " " 20 cwts. 3 qrs. 21 lbs. at £2, 3s. 8*1*<sub>2</sub>d. per qr.?
- " " 2 cwts. 1 qr. 21 lbs. at £66, 4s. per cwt.?
- " " 2 tons 10 cwts. 3 qrs. 21 lbs. at £6, 7s. 10d. per cwt.?
- " " 5 ac. 1 rd. 32 per. at £47, 10s. per acre?
- " " 5 stones 3 lbs. 2 oz. at £1, 4s. 10d. per st.?
- " " 4 tons 1 cwt. 1 qr. 14 lbs. at £4, 17s. 6d. per ton?
- " " 9 tons 15 cwts. 2 qrs. 11 lbs. at £4, 13s. 4d. per cwt.?
- " " 2 lbs. 5 ozs. 11 dwts. 8 grs. at 7s. 6d. per oz.?
- " " 8 cwts. 3 qrs. 16 lbs. 12*5* ozs. at £7, 9s. 4d. per cwt.?
- " " 17 cu. yds. 9 cu. ft. 1296 cu. in. at £3, 3s. per cu. yd.?

Find the price of 18 cwts. 1 qr. 18 lbs. at £8, 12s. 4d. per ton.

Simplify  $(\frac{15}{315} \div \frac{45}{63})$ .

Reduce .625 of 2 furlongs 10 poles to the decimal of 1 mile.

If '3 of an estate cost £450, 15s., what will '48 of it cost?

Reduce  $\frac{1}{4}$  of 1*1*<sub>2</sub> of 2s. 6d. to the decimal of £4, 10s.

$.0017 \times .036 \div .034$ .

Simplify, and give the answer as a decimal,  $\frac{2\frac{1}{3}}{\frac{1}{2}} + \frac{1\frac{1}{2}}{1\frac{2}{3}} + \frac{1}{3}$  of  $\frac{1}{8}$ .

Reduce 14s. 6d. to the decimal of 3 guineas.

If  $\frac{5}{8}$  of a ship cost £273.25, how much will  $\frac{5}{8}$  of it cost?

Reduce  $\frac{2}{3}$  of 3 lbs. 3 ozs. to the decimal of 3 cwt.

If 1.5 in. of wire weigh '3 of an ounce, what is the weight of 7 miles of such wire?

Simplify  $\frac{7 \times .007}{49} \times \frac{3.6 \times .36}{36}$ .

Reduce  $\frac{1}{8}$  of 10s. +  $\frac{1}{2}$  of  $\frac{2}{3}$  of 27s. to the decimal of £1, 5s. 9d.

Reduce 6 feet to the fraction of  $\frac{1}{2}$  mile.

If unity be worth £3.5, what is the value of '8?

$(20.8 - 8.902) \div .008$ .

Divide .01 by (.001  $\times$  10000).

From .983 take .7894.

Reduce .9*6*, .51*0*, and .43*8* to vulgar fractions.

What decimal of £2 is  $\frac{5}{14}$  of half a guinea?

Add .9*8*, .7*6*5, .9*8*0*7*, and .6*7*8*9*4.

.6*9*8  $\times$  .7*8*9*3*.

- (131.) What is the value of  $\frac{1}{4}25$  of 3 tons 3 cwt. 3 qrs.?
- (132.) From 7 $\frac{1}{2}$  take 3 $\frac{1}{2}$ .
- (133.) Reduce  $2\frac{1}{2}$ ,  $5\frac{1}{2}$ , and  $5\frac{1}{2}$  to vulgar fractions.
- (134.) What decimal of half a guinea is  $\frac{1}{3}$  of 3s. 6d.?
- (135.) Add 793 - 56 - 2837 - 56789.
- (136.)  $7\frac{1}{2} \times 8\frac{1}{2} \times 9\frac{1}{2}$ .
- (137.) What is the value of 375 of 3 mls. 5 fur. 25 poles?
- (138.) Reduce  $2\frac{1}{2}$ ,  $5\frac{1}{2}$ , and  $5\frac{1}{2}$  to vulgar fractions.
- (139.) What decimal of  $1\frac{1}{2}$  guineas is  $5\frac{1}{2}$  times 1s. 6d.?
- (140.)  $567 \times 48963$ .
- (141.) A can do a piece of work in 5 days, B can do it in 6 days; in how many days could they do it working together?
- (142.) Mary could make a dress in 3 days, Harriet could do it in 4 days, and Jessie in 5 days; how long would it take if they all worked together?
- (143.) A cistern can be filled by one tap in 10 minutes, by another in 12 minutes, and by a third in 15 minutes; how long would it require if they were all running together?
- (144.) A and B can do a piece of work in 3 days. A alone could do it in 12 days; how long would B require to do it?
- (145.) A can do a piece of work in  $1\frac{1}{2}$  days, B in  $2\frac{1}{2}$  days, and C in  $3\frac{1}{2}$  days; how long would it take to do it if they all worked together?
- (146.) A can dig a trench in  $2\frac{1}{2}$  days, B in  $1\frac{1}{2}$  days, and C in  $\frac{2}{3}$  of a day; how long would it take if they all worked together?
- (147.) A man and his son can do a certain work in  $3\frac{1}{2}$  days, the son could do it by himself in 14 days; how long would it take the man alone?
- (148.) A can do a piece of work in 3 days and B in 10 days; how long would it take if they both work together?
- (149.) An estate is worth £10,000. A owns the  $\frac{1}{3}$  of it. He loses the  $\frac{1}{2}$  of his share and bestows half of the remainder to B. What is the value of what he now possesses?
- (150.) A cistern can be filled by one tap in 5 minutes, by another in 10 mins. It can also be emptied by a third tap in 8 minutes. Suppose the cistern is empty, and all three taps turned on, in what time would the cistern be full?

## COMPOUND PROPORTION.

Compound Proportion is the rule employed instead of Simple Proportion when 5, 7, or 9 terms are given, to find the 6th, 8th, or 10th terms respectively.

The principle of the rule is the same as in Simple Proportion.

*Rule:*—1st. Write the odd term, or that which is of the same kind as the answer, in the third place.

2d. Arrange the terms of the same kind in pairs, and state each pair, according to the rule of Simple Proportion, on the supposition that the terms of the remaining pairs are equal.

3d. Divide the product of the Consequents and the 3d term by the product of the Antecedents for the answer.

Example:—If 3 men earn £15 in 20 days how many men will earn 15 guineas in 9 days?

A summary of the question should be written as follows, arranging terms of the same kind in pairs:—

| men. | $\frac{\text{£}}{}$ |             |
|------|---------------------|-------------|
| If 3 | 15                  | in 20 days. |
| ?    | $15\frac{3}{4}$     | "           |

---

$$\text{Statement: } \left. \begin{array}{l} 15 : 15\frac{3}{4} \\ 9 : 20 \end{array} \right\} \text{men.} \quad \left. \begin{array}{l} \text{men.} \\ :: 3 : \end{array} \right\} \text{Ans.}$$

$$\frac{7}{15\frac{3}{4} \times 20 \times 3} = \frac{63 \times 20 \times 3}{4 \times 15 \times 9} = 7 \text{ men.} \quad \text{Ans.} = 7 \text{ men.}$$

### Exercise 6.

- (1.) If 6 horses plough 15 acres in 12 days, how many acres will 14 horses plough in 30 days?
- (2.) If 3 fires consume 65 cwts. of coal in 26 days, in how many days will 12 fires consume 4 tons?
- (3.) If 13 men dig a trench in 16 days of 10 hrs. each, in how many days should 52 men do it if they work 9 hours a day?
- (4.) If the cost of 750 soldiers for 12 days be £900, how long can 2000 soldiers be maintained for £3000 at the same rate?
- (5.) If the interest on £100 for 1 year be £4, 15s., what is the interest on £280 for 292 days?
- (6.) If 7 men mow 6 acres in 12 hours, how many men will mow 15 acres in 14 hours?
- (7.) The interest on £5 for 219 days is 5s. Find the interest on £100 for 1 year.
- (8.) If 14 reapers cut 21 acres of wheat in 6 days, how many will cut down 150 acres in 10 days?
- (9.) If £18 be the interest on £460 for 9 months, what is the interest on £100 for 12 months?
- (10.) If 3 cwts. 3 qrs. be carried  $51\frac{1}{2}$  miles for 18s., what weight should be taken  $17\frac{1}{2}$  miles for £1?
- (11.) The cost of keeping 25 horses is £11, 6s.  $0\frac{1}{2}$ d. per week. What will be the cost of keeping 14 horses from 1st September to October 31?
- (12.) If a man earns 30s. in 8 days, working 9 hours a day, in how many days will he earn 50s., working 10 hours a day?
- (13.) If the interest on £100 for 1 year be £4, 10s., what will be the interest on £325, 14s. 6d. for 2 years?

- (14.) If 4 men earn £15 in 20 days, how many men will earn 10 guineas in 7 days?
- (15.) When wheat is 50s. per bushel a 4-lb. loaf can be bought. What ought a 6d. loaf to weigh when wheat is 45s. per bushel?
- (16.) If 6 men can earn £20 in 21 days of 12 hours each, how many men can earn £10 in 35 days of 10 hours each?
- (17.) If 6 men dig a trench 15 yds. long and 2 yds. wide in 12 hours each, in how many days of 8 hours each will they dig a trench 10 yds. long and 8 yds. broad?
- (18.) If 14 mowers mow 130 acres in 8 days, working 10 hours each day, how many acres would be mown by 21 mowers, working 5 days 9 hours per day?
- (19.) If the freight of a sloop of 120 tons for 7 months be £100, what ought to be paid for one of 150 tons for 4 months?
- (20.) If 35 men perform a piece of work in 27 days of 7 hours each, in what time will 27 men do the same working 10 hours each day?
- (21.) A person lodged £400 in the bank, and when he drew it out 146 days later he received £4, 16s. interest. What was the rate per annum?
- (22.) If 10 masons working 10 hours per day take 16 days to build 360 feet of a wall, how many feet will 25 masons build in 9 days working 12 hours per day?
- (23.) A parcel of 5 lbs. 7 ozs. is carried 120 miles for 1s. 8 pence. How much will it cost to carry 16 lbs. 5 ozs. a distance of 180 miles at the same rate?
- (24.) If a pane of glass 18 inches long and 12½ inches wide costs 12s. 6d., what will be the cost at the same rate of a pane 24 inches long and 15 inches wide?
- (25.) If 17½ yards 54 inches wide cost £3, 18s. 9d., what ought the cost of 30 yards of the same quality but only 40 inches wide to be?
- (26.) If £150 support a family of 8 persons for 10 months, how much would £120 support a family of 5 persons?
- (27.) If 40s. pay 8 men for 5 days' work, how much will pay for 24 days' work?
- (28.) If 2 horses eat 8 bushels of oats in 16 days, how many bushels will 3000 quarters last in 24 days?
- (29.) If 7 men earn £4, 15s. 3d. in 5½ days, what sum will 10 men earn in 15½ days?
- (30.) If 18 men dig a trench 30 yds. long in 24 days, how many men will dig one 60 yds. long in 72 days?
- (31.) If 3 lbs. of bread be sold for 1s. when wheat is £2 per cwt. weight, what ought I to get for 2s. 3d. when wheat has risen to 3s. per cwt.?
- (32.) If 7½ cwts. be carried 125 miles for 14s. 7d., find the cost of 3 tons 15 cwts. for 200 miles.
- (33.) If 4 men earn £7, 10s. in 10 days, how many men will earn 10 guineas in 7 days?
- (34.) If 170 qrs. of oats serve 5 horses for 178½ days, how many horses will eat 580 qrs. in 278½ days?

- (35.) If 7 bush. 2 pkgs. be consumed by 10 horses in 7 days, how many horses will consume 3 qrs. 6 bush. in 10 days?
- (36.) If 5 horses eat 8 bush.  $1\frac{1}{2}$  pkgs. of oats in 9 days, how long at the same rate will 66 bush.  $3\frac{3}{4}$  pkgs. last 17 horses?
- (37.) If 70 men dig 1 ac. 2 rds. 10 per. in 5 days, how many men will dig  $2\frac{1}{2}$  acres in 28 days?
- (38.) If 3 persons are boarded 4 weeks for £7, how many can be boarded 13 weeks 5 days for £112?
- (39.) If 17 men earn £11, 6s. 8d. in 2 days, how many men will earn £12 in 4 days?
- (40.) How many hours a day must 24 men work to accomplish as much in 5 days as 25 men could do in 4 days if they worked 6 hrs. a day?
- (41.) If, when meat is 9d. per lb., it costs £11, 16s. 3d. to supply a family of 12 persons for 5 weeks, how much will it cost to supply a family of 18 persons for 7 wks., when meat is 1s. per lb.?
- (42.) If 15 men earn £63 in 25 days, in how many days will 20 men earn £35?
- (43.) If a man walk 600 miles in 25 days, walking 8 hours a day, in how many days will he walk 330 miles, walking 10 hrs. a day?
- (44.) If 6 men can do a piece of work in 30 days of 9 hrs. each, how many men will it take to do 10 times the amount if they work 25 days of 8 hours each?
- (45.) If the cost of printing a book of 320 leaves with 21 lines in each page and on an average 11 words in each line be £19, find that of printing a book with 297 leaves, 28 lines in each page, and 10 words in each line.
- (46.) What is the quarter's rent of 350 acres of land, if £11, 5s. 9d. per annum be given for 9 acres?
- (47.) If a family of 7 persons can live on £140 for 28 weeks, how long can a family of 9 persons live on £135?
- (48.) If the wages of 4 men for 12 days be £6, what would be the wages of 6 men for 10 days?
- (49.) If the wages of 54 men for 36 days amount to £60, 15s., what will be the wages of 30 men and 50 boys for 32 days, supposing 2 men to do as much work as 5 boys?
- (50.) The produce of a field of wheat yielding 4 qrs. per ac. is worth £148 when wheat is £3 per qr., what will the produce of the same field be worth when the yield is 5 qrs. per ac., and wheat is 50s. per qr.?
- (51.) If 12 furnaces consume 12 tons 10 cwts. of coal in 10 hrs., how long will 7 furnaces be in consuming 15 tons?
- (52.) If the wages of 29 men for 54 days amount to £80, 9s. 6d., how many men must work 12 days to receive £407?
- (53.) If 32 horses eat 96 bushels of corn in 21 days, for how many days will 66 bushels feed 7 horses?
- (54.) If £100 pay for the railway travelling of 20 passengers for

- If days of 11 hrs. each, how long would it last 16 travellers, travelling 5 hrs. a day?
- (1.) If 1 acre eat 1 tonne of hay in a month, how long will it take 45 sheep to eat 15 tonnes, all or consuming as much as 3 sheep?
- (2.) If 11 horses and 149 sheep can be kept for 9 days for £75, 15s., what sum will keep 11 horses and 182 sheep for 8 days, supposing 1 horse to eat as much as 84 sheep?
- (3.) If 21 men build a wall 50 ft. long, 10 ft. high, and 18 inches thick in 12 days working 5 hrs. a day; how thick a wall could 17 men build, 40 ft. long, 15 ft. high, in 21 days, working 5 hrs. a day?
- (4.) If a tradesman with a capital of £2000 gain £50 in 3 months, what sum will be gained with a capital of £9000 in 1 yr. and 3 months?
- (5.) How many horses would be required to plough 117 acres in 35 days, if 11 horses can plough 13 ac. in 7 days?
- (6.) If 7 needlewomen can finish a piece of work in  $10\frac{1}{2}$  days of 8 hrs. each, how long will it take 3 women to do 2 such pieces if they work 11 hrs. a day?
- (7.) If 2157 lbs. pay for the education of 20 boys for 6 months, how long will 2150 pay for 5 boys?
- (8.) If a family of 7 people spend £120 in 8 months, how much will maintain a family of 14 persons 16 months?
- (9.) If 40 bushels of corn serve 12 horses for 37 days, how many days would 147 bushels serve 9 horses?
- (10.) A 20 horse-power engine pumps 40 gallons of water from a pit 100 yds. deep in 1 hr.; what quantity of water would a 35 horse-power engine pump from a depth of 235 feet in 141 days working night and day?
- (11.) How many men working at the rate of 5½d. per hour for 9 hrs. on each of 18 days can earn the same wages as 22 men working at the rate of 5½d. per hour for 9½ hrs. on each of 18 days?
- (12.) If 15 men can dig a trench 200 yards long, 3 yds. wide, and 2 yards deep in 6 days of 10 hours each; in how many days of 8 hours each will 10 men dig a trench 100 yds. long, 4 yds. wide, and 3 yds. deep?
- (13.) If 44 labourers can do a piece of work in 15 days of 10 hrs. each, how many navvies must be employed to do  $\frac{2}{3}$ ths more work in 7 days of 11 hrs., supposing 3 navvies able to do as much work as 5 labourers?
- (14.) A copyist can transcribe 3 pages of a certain work in  $1\frac{1}{2}$  hrs; how long will it take 3 men working only half as rapidly to copy 36 pages of another volume, the pages of which contain  $\frac{1}{2}$  as much again as those of the former?
- (15.) If 24 men or 38 boys can do a piece of work in 6 days, how long will it take 20 men and 6 boys to do twice as much?
- (16.) If 15 men can perform the half of a piece of work in 10 days, working 8 hours a day; in what time will 50 men perform the whole work, working 7 hours a day?

- 71.) If 500 men have food enough for 9 weeks, allowing each man 15 ozs. a day; how long will that food last if their number be increased by 225 men and they are allowed 12 ozs. per day?
- 72.) If the cost of keeping 90 bullocks for 75 days be £450, how long will 12 be kept for £30?
- 73.) If 8 women or 6 men can do a piece of work in 14 days, in what time will 1 man and 1 woman working together do three times as much?
- 74.) If £47, 5s. is sufficient to pay the carriage of 17·4 cwts. for 72 mls., what would be the carriage of 14·4 cwts. for 52·2 miles?
- 75.) If 14 masons erect a wall in 20 $\frac{1}{2}$  days of 9 $\frac{1}{2}$  hours each, how long will it take 6 masons to do 2 $\frac{1}{2}$  times the work, reckoning 10 hours a day?
- 76.) If 8 men perform a piece of work in 12 days, how many men will perform a piece of work six times as great in  $\frac{1}{2}$  of the time?
- 77.) Two men do a piece of work in 48 days, and 1 man = 3 boys. How many days will it take 18 boys to do  $\frac{1}{4}$  of the work?
- 78.) If 80 men can reap 400·6 acres in 6·375 days, how many acres ought 60 men to reap in 51 dys.?
- 79.) If 37 men do  $\frac{2}{3}$  of a piece of work in 8 $\frac{1}{2}$  days, how long will it take 30 men to do  $\frac{2}{3}$  of the work?
- 80.) If a garrison of 3500 men have provisions to last for 27 days, allowing each man 2 lbs. a day; how long would the same provisions last if 500 men were sent away, and the daily allowance for each man increased to 2 lbs. 4 ozs. a day?

## SIMPLE INTEREST.

**INTEREST** is money paid for the loan or use of money.

The **PRINCIPAL** is the money lent.

The **AMOUNT** is the Principal and the Interest added together.

Interest is calculated at so much per cent. Thus 5 per cent interest means £5 for the use of every £100. The amount of interest paid for each £100 is called the *Rate* per cent.

Money borrowed must be paid for according to the time it is held; thus another consideration comes in—the *Time*.

The more clearly the meaning and relation of the terms Principal, Interest, Amount, Rate, and Time are understood, the more readily will the pupil gain an accurate conception of the methods employed in the solution of questions.

To find the Simple Interest on a given Principal for a given time (in years) at a given rate.

Rule.—Multiply the Principal by the time and by the rate, and divide the product by 100.

**Example 1:**—Find the interest on £785 for  $3\frac{1}{2}$  years at 4%.

$$\begin{array}{r}
 735 \\
 \times 4 \\
 \hline
 2940
 \end{array}$$

When dividing by 100, we simply remove the decimal 2 places to the left in the pounds, and the result becomes—

$$\begin{array}{r} \underline{\underline{£102\cdot90}} \\ \quad \quad \quad 20 \\ \hline \quad \quad \quad s. 18\cdot00 \\ \therefore \text{Ans.} = £102, 18s. \end{array}$$

In Interest, however, all questions can be worked by prop  
from which method the above rule immediately follows.

**Example 1** is thus worked by proportion:—

If £100 produce £4 in 1 yr.,  
£735 „ „ ? „ 3½ yrs.

$$100 : 735 \left\{ \begin{array}{l} \\ 1 : 3\frac{1}{7} \end{array} \right. :: £4.$$

$$Ans. \frac{735 \times 3\frac{1}{2} \times 4}{100} = \frac{735 \times 7 \times 4}{100} = \underline{\underline{\mathbf{£102, 18s.}}}$$

When the Time is given in months, it must be reduced to a fraction of a year.

Questions in Simple Interest are sometimes solved by using the following formulæ, where  $I$  = Interest,  $P$  = Principal,  $T$  = Time and  $R$  = Rate.

$$(a) \quad I = \frac{P \times R \times T}{100}$$

$$(b) P = \frac{I \times 100}{R \times T}$$

$$(c) R = \frac{I \times 100}{P \times T}$$

$$(d) T = \frac{I \times 100}{R \times R}$$

This method is much neater, and often much shorter, than the other, but it has the disadvantage of being inapplicable when Amount, Time, and Rate are given, to find the Principal. The type of question must be solved by Proportion.

## Exercise 7.

Find the Interest on:—

- (1) £400 for 2 years at 4 per cent.
- (2) £98 for 5 years at 3 per cent.
- (3) £775 for 3 years at 6 per cent.
- (4) £2418 for 4 years at 5 per cent.
- (5) £620 for 1½ years at 8 per cent.
- (6) £75 for 4½ years at 4 per cent.
- (7) £1000 for 7 years at 2½ per cent.
- (8) £860 for 2½ years at 5½ per cent.
- (9) £2600 for 3½ years at 3½ per cent.
- (10) £50 for 12½ years at 4½ per cent.
- (11) £520 for 6½ years at 2½ per cent.
- (12) £500 for 3 years at 3½ per cent.
- (13) £75, 10s. for 12 years at 3 per cent.
- (14) £252, 10s. for 3 years at 4 per cent.
- (15) £418, 15s. for 5 years at 2 per cent.
- (16) £37, 4s. for 2 years at 6 per cent.
- (17) £315, 5s. for 3½ years at 3 per cent.
- (18) £2612, 12s. for 6 years at 4½ per cent.
- (19) £180, 17s. 6d. for 2½ years at 3½ per cent.
- (20) £42, 13s. 4d. for 4 years at 5½ per cent.
- (21) £820 for 1½ years at 8 per cent.
- (22) £3600 for 3½ years at 3½ per cent.
- (23) £95 for 6 years at 1½ per cent.
- (24) £75 for 8 years at 1½ per cent.
- (25) £418, 15s. for 7 years 7 months at 2 per cent.
- (26) £280, 17s. 6d. for 8 years 5 months at 3½ per cent.
- (27) £3400 for 5 years 5 months at 3½ per cent.
- (28) £180, 7s. 6d. for 9 years 7 months at 5 per cent.
- (29) £4800 for 7 months at 4½ per cent.
- (30) £980, 12s. 6d. for 8 years 5 months at 4 per cent.

The *Amount* is found by adding the Interest to the Principal.

The *Commission* paid to an agent, and the *Premium* to an insurance company, are calculated in the same manner as Interest.

## Exercise 8.

- (1.) What will £75 amount to in 3 years at 2½%?
- (2.) What interest will £650 produce at 4% for 4½ years?
- (3.) Find the interest on £710 for 6 months at 4% per annum.
- (4.) At 3½ per cent what will the interest on £452, 10s. be in 16 years?
- (5.) I lend out £90 for 2 years 9 months at the rate of 4%; what amount should I receive at the end of that time?
- (6.) Find the interest on £2650 for 1 year 7 months at 7½%.
- (7.) At ½ per cent what is the commission on £1500?

- (a.) What is the amount of £112, 10s. 6d. for 4 years at  $3\frac{1}{2}\%$ ?  
 (b.) Fire insurance being charged at the rate of  $\frac{1}{10}\%$ , what will be charged for a house worth £740?  
 (c.) Find the interest on £62, 14s. 9d. for 3 years at 4%.  
 (d.) Find the amount of £418, 15s. for 7 years 7 months at 2%.  
 (e.) What is the amount of £180, 7s. 6d. for 9 years 7 months?  
 (f.) Find the amount of £950, 12s. 6d. for 8 years 5 months.  
 (g.) Find the interest on £319, 3s. 6d. for  $4\frac{1}{4}$  years at  $3\frac{3}{4}\%$ .  
 (h.) What must be paid for the loan of £184, 14s. 8d. for 3 years 2 months at  $4\frac{1}{2}\%$ ?  
 (i.) Find the amount of £700 for 13 years 9 months at  $6\frac{1}{4}\%$ .  
 (j.) What is the interest on £68, 3s. 9d. for  $4\frac{1}{2}$  years at  $2\frac{1}{4}\%$ ?  
 (k.) The rate of interest being 6 per cent, what is the amount of £310, 14s. for  $2\frac{1}{2}$  years?  
 (l.) Find the interest on £29, 12s. 7d. for  $3\frac{1}{2}$  years at 4%.  
 (m.) A person puts £1250 to interest at  $4\frac{1}{4}$  per cent, what income will be derived from it?

When it is required to find the interest on a given principal for a given time (*in days*) at a given rate, the following is the rule sometimes termed the third, tenth and tenth rule:—

1st. Multiply the principal by double the rate, and the product by the number of days.

2d. Divide the product by 3, the result by 10, and this again by 10, in each case neglecting remainders.

3d. Add the last four lines together, and point off 5 places of decimals.

4th. From the result, reject one farthing for every £10, & the remainder is the interest.

Example 2.—Find the simple interest on £500 for 45 days.

$$\begin{array}{r}
 500 \\
 \hline
 5 = \text{double the rate} \\
 \hline
 2500 \\
 45 \\
 \hline
 12500 \\
 10000 \\
 \hline
 3 \quad 112500 \\
 10 \quad 87500 \\
 10 \quad 8750 \\
 | \quad 375 \\
 \hline
 1.54125 \\
 20 \\
 \hline
 10.82500 \\
 12 \\
 \hline
 9.90000 \\
 4 \\
 \hline
 3.60000
 \end{array}
 \qquad \text{Ans. = £1, 10s. 9d.}$$

When the number of days happen to be 73, 146, 219, or 292, it is more convenient to take them as fractions of a year. They are respectively  $\frac{1}{3}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$ , and  $\frac{5}{8}$  of a year.

### Exercise 9.

Find the Interest on:—

- |  |   |
|--|---|
| (1.) £235 for 292 days at $2\frac{1}{2}\%$ .                           | (8.) £75 for 270 days at $1\frac{1}{4}\%$ .           |
| (2.) £235 for 175 days at $2\frac{1}{2}\%$ .                           | (9.) £816, 17s. 6d. for 73 days at $3\frac{1}{4}\%$ . |
| (3.) £235 for 240 days at $2\frac{1}{2}\%$ .                           | (10.) £860, 12s. for 146 dys. at 5%.                  |
| (4.) £480 for 219 days at $2\frac{1}{2}\%$ .                           | (11.) £930 for 219 days at $3\frac{1}{2}\%$ .         |
| (5.) £480 for 185 days at $2\frac{1}{2}\%$ .                           | (12.) £618 for 292 days at $1\frac{1}{2}\%$ .         |
| (6.) £75 for 146 days at $1\frac{1}{2}\%$ .                            | (13.) £397 for 65 days at $2\frac{1}{4}\%$ .          |
| (7.) £75 for 175 days at $1\frac{1}{4}\%$ .                            |   |
| (14.) £920 from 1st May to 13th Nov. at $3\frac{1}{4}\%$ .             |   |
| (15.) £817, 19s. 6d. from 3d July to 19th Dec. at 5%.                  |   |
| (16.) £319, 10s. from 5th Jan. to 17th Aug. at 3%.                     |   |
| (17.) £973 from 17th April to 29th Oct. at $3\frac{1}{4}\%$ .          |   |
| (18.) £347, 13s. 9d. from 12th May to 13th Sept. at $1\frac{1}{4}\%$ . |   |
| (19.) £872 from 17th June to 13th Jan. at $3\frac{1}{4}\%$ .           |   |
| (20.) £314, 12s. 6d. from 15th July to 12th Feb. at 5%.                |   |
| (21.) £817 from 12th Aug. to 17th Dec. at $3\frac{1}{4}\%$ .           |   |
| (22.) £360 from 19th June to 8th Oct. at $2\frac{1}{4}\%$ .            |   |
| (23.) £917, 18s. 9d. from 11th March to 13th Sept. at 2%.              |   |
| (24.) £360, 19s. 4d. from 13th May to 8th Aug. at $3\frac{1}{4}\%$ .   |   |

To find the Rate per cent:—

Example 3:—At what rate per cent would £75 produce £10, 5s. in  $3\frac{5}{8}$  years?

By Compound Proportion thus:—

If £75 produce £10, 5s. in  $3\frac{5}{8}$  years,  
£100      "      ?      in 1 year?

$$\begin{array}{rcl} 75 & : & 100 \\ 3\frac{5}{8} & : & 1 \end{array} \quad \left\{ \begin{array}{l} :: \\ 4 \qquad \qquad 3 \end{array} \right. \\ \text{Ans. } \frac{100 \times 4 \times 12}{4 \times 75 \times 41} = 4\%. \end{array}$$

When the Principal, Amount, and Time are given, to find the Rate, the Principal must be subtracted from the Amount to get the Interest, before resolving the question into Compound Proportion.

### Exercise 10.

- (1.) At what rate per cent will £1450 gain £141, 7s. 6d. in 6 years?
- (2.) In 2 years the interest on £250 amounts to £52, 10s.; what is the rate per cent?

- (1) At what rate per cent will £245 amount to £311, 3s. in  $4\frac{1}{2}$  yrs?  
 (2) At what rate per cent will £550 gain £137, 10s. in 6 years?  
 (3) £120 lent for  $3\frac{1}{2}$  years, and the interest is £21; what is the rate per cent?  
 (4) Find the rate per cent when £1250 gains £265, 12s. 6d. in 5 yrs.  
 (5) At what rate per annum will the interest on £800 amount to £170 in 5 years?  
 (6) £100 lent for  $3\frac{1}{2}$  years, and the interest is £35; what is the rate per cent?  
 (7) Find the rate per cent when £500 gains £101, 5s. in nine years.  
 (8) At what rate will £426 amount to £452, 12s. 6d. in  $2\frac{1}{2}$  yrs?  
 (9) £2100 amount to £5250 in 8 years?  
 (10) £4420 amount to £6121, 14s. in  $5\frac{1}{2}$  years?  
 (11) £4323 gain £916, 6s. 3d. in  $4\frac{1}{2}$  years?  
 (12) The sum of £3390 amounts in  $4\frac{1}{2}$  years to £4124, 0s. 3d.; what is the rate of interest?  
 (13) A gentleman who invested £3750, received £716, 6s. 2½d. as interest in 8 years; what was the yearly rate %?  
 (14) At what rate % would £823 gain £147, 9s. 4½d. in  $5\frac{1}{2}$  years?  
 (15) The sum of £370 amounts in  $6\frac{1}{2}$  years to £450, 18s. 9d.; what is the rate %?  
 (16) A gentleman received £829, 8s. 9d. as interest on £2510 in 5 years; find rate %.  
 (17) £140 amounts in  $7\frac{1}{2}$  years to £1831, 10s.; find rate %.  
 (18) The sum of £6370 produces £1075, 16s. interest in 6 years; find rate per cent per annum.

To find the TIME.

Example 4. In what time will £250 amount to £300 at 5% per annum?

$\frac{300 - 250}{250} = \frac{50}{250}$  int. on £250 for required time at 4%.

If £100 produce £4 in 1 year.  
 $\frac{100}{100} = \frac{4}{100}$  in 1 year.

$\frac{50}{100} : \frac{100}{100} :: 1 : 1$  year.

$\frac{5}{10} : \frac{10}{10} :: 1 : 1$  year.

$10 \times 5 = 50$   $\times 1 = 5$  years.

$250 : 4$

$10$

*Ans. = 5 years.*

### Exercise 11.

- (1) In what time will £70 produce 70 shillings at the rate of 22%?  
 (2) £750 lent out at  $4\frac{1}{2}\%$  produces in time another £750; how long does it take?  
 (3) How long will it take £760 to amount to £931 at 5%?  
 (4) In what time will 4% interest on £150 amount to £20, 10s?  
 (5) In what time will £90 = shillings at 5%?

- (6.) In what time will £960 double itself at  $2\frac{1}{2}\%$ ?  
 (7.) In what time will the interest on £250 amount to £15, 12s. 6d. at the rate of  $2\frac{1}{2}\%$ ?  
 (8.) In what time will £80 produce 80 shillings at  $1\frac{1}{4}\%$ ?  
 (9.) In what time will £780 double itself at  $4\%$ ?  
 (10.) In what time will £230 amount to £261, 1s. at  $4\frac{1}{2}\%$ ?  
 (11.) In what time will £250 produce £8, 6s. 8d. at  $2\frac{1}{2}\%$ ?  
 (12.) In what time will £950 gain £249, 7s. 6d. at  $5\frac{1}{2}\%$ ?  
 (13.) In what time will the interest on £3981, 1s. 4d. at  $3\frac{1}{8}\%$  per annum amount to £404, 6s.  $6\frac{1}{2}$ d.?  
 (14.) What time will elapse before an investor of £3220 at  $5\frac{1}{2}\%$  receives the sum of £1296, 1s. as interest?  
 (15.) In what time will £2000 gain £577, 10s. at  $5\frac{1}{2}\%$ ?  
 (16.) In what time will the interest on £110, 12s. 6d. at  $5\frac{1}{2}\%$  amount to £14, 15s.?  
 (17.) What time will elapse before an investor of £2570 at  $6\%$  receives the sum of £848, 2s. as interest?  
 (18.) In what time will £330 gain £190, 11s. 6d. at  $5\frac{1}{2}\%$ ?  
 (19.) In how many years will the interest on £1986 at  $4\frac{1}{2}\%$  per annum amount to £430, 6s.?  
 (20.) What time will elapse before an investor of £3975 at  $3\frac{1}{2}\%$   
     + receives the sum of £695, 12s. 6d. as interest?

To find the Principal.

There are two cases—(1) To find what principal *amounts* to a certain sum in a given time at a given rate; and (2) to find what principal will *produce* a certain sum in a given time at a given rate.

Example (1):—What Principal will amount to £300 in 5 yrs. at  $4\%$ ?

First, find what £100 will amount to in 5 years at  $4\%$ , and the question then resolves itself into one in Simple Proportion.

$$\begin{array}{r} \text{£100 amounts to £120 in 5 years at } 4\%. \\ ? \quad " \quad \text{£300} \quad " \quad " \end{array}$$

As £120 : £300 :: £100 : Ans.

$$\therefore \text{Ans. } \frac{\frac{50}{5} \times 100}{120} = \text{£250.}$$

Example (2):—What Principal will produce £40 in 2 yrs. at  $5\%$ ?

$$\begin{array}{r} \text{£100 will produce £10 in 2 yrs. at } 5\%. \\ ? \quad " \quad \text{£40} \quad " \quad " \end{array}$$

As £10 : £40 :: £100 : Ans.

$$\text{Ans. } \frac{40 \times 100}{10} = \text{£400.}$$

Example (2) can be worked by the formula  $P = \frac{I \times 100}{R \times T}$ , as the sum to be produced is the interest on the required principal.

Exercise 12.

What principal will amount to:—

- (1.) £4373 in  $3\frac{1}{2}$  years at  $4\frac{1}{2}\%$ ?
- (2.) £3367. 10s. in  $3\frac{1}{2}$  years at  $3\frac{1}{2}\%$ ?
- (3.) £3733. 5s. 6d. in 7 years at  $3\frac{1}{2}\%$ ?
- (4.) £255. 11s. 6d. in 4 years at  $3\frac{1}{2}\%$ ?
- (5.) What sum will produce £641. 1s. 6d. in 7 years at  $5\frac{1}{2}\%$ ?
- (6.) What sum will produce £180. 1s. 6d. in  $3\frac{1}{2}$  years at  $3\frac{1}{2}\%$ ?
- (7.) What sum will produce £165. 18s. 9d. in  $4\frac{1}{2}$  years at  $3\frac{1}{2}\%$ ?
- (8.) Find the sum which will in 4 yrs. 3 mos. produce £373. 14s. 4d. to  $4\frac{1}{2}\%$ ?
- (9.) What principal will amount to £1128 in 5 years at  $4\frac{1}{2}\%$ ?
- (10.) What principal will amount to £954. 18s. 9d. in  $4\frac{1}{2}$  yrs. at  $3\frac{1}{2}\%$ ?
- (11.) What principal will amount to £257. 15s. in  $5\frac{1}{2}$  years at  $5\frac{1}{2}\%$ ?
- (12.) What principal will amount to £5141. 5s. in  $4\frac{1}{2}$  years at  $3\frac{1}{2}\%$ ?
- (13.) What sum will produce £743. 2s. in 6 years at  $5\frac{1}{2}\%$ ?
- (14.) What sum will produce £695. 11s. 6d. in 5 years at  $3\frac{1}{2}\%$ ?
- (15.) What sum will produce £7. 8s. 10s. in 9 years at  $3\frac{1}{2}\%$ ?
- (16.) Find the sum which will in 4 yrs. 3 mos. produce £396 at  $3\frac{1}{2}\%$  per annum.
- (17.) What principal will amount to £1066 in  $2\frac{1}{2}$  years at  $4\%$ ?
- (18.) What principal will amount to £1080. 1ds. 2d. in  $3\frac{1}{2}$  yrs. at  $3\frac{1}{2}\%$ ?
- (19.) What sum must I invest to secure £90 in 2 years at  $5\%$ ?
- (20.) At  $4\frac{1}{2}\%$  interest how much capital will produce £20. 10s. in 3 yrs. 5 mos.?
- (21.) Find the amount which must be invested at  $4\%$  to produce £30 a year.
- (22.) What sum of money will amount to £336 in  $1\frac{1}{2}$  years at  $4\%$ ?
- (23.) What principal will produce £40. 17s. 6d. in 4 years at  $3\frac{1}{2}\%$ ?
- (24.) What sum of money will in 6 years 10 months produce £41 interest at  $4\frac{1}{2}\%$ ?
- (25.) What must I invest at  $4\frac{1}{2}\%$  per annum to gain £160 in 4 years?
- (26.) What sum will amount to £1336. 11s. 3d. in 3 years at  $4\frac{1}{2}\%$ ?
- (27.) What principal lent for 6 years 5 months at  $3\frac{1}{2}\%$  will amount to £192?
- (28.) How much capital will produce £12. 10s. in 1 yr. 3 mos. at  $5\%$ ?
- (29.) What sum of money will gain £5. 10s. in 2 years at  $4\frac{1}{2}\%$ ?
- (30.) What principal will amount to £300. 16s. in 4 years at  $5\%$ ?

**MISCELLANEOUS QUESTIONS IN SIMPLE INTEREST.**Exercise 13.

- (1.) Find the interest on £625 from 3d March to 8th August at  $\frac{1}{2}\%$ .
- (2.) Find the interest on £2346 for 9 years 7 months at  $4\frac{1}{2}\%$ .
- (3.) At what rate per cent will a sum of money double itself in 2 years?

- (4.) In what time will a sum of money quadruple itself at  $4\frac{1}{2}\%$ ?
- (5.) Find the amount of £840 from 26th May till Christmas at 4%.
- (6.) Find the interest on £516 for 9 years 11 months at  $2\frac{3}{4}\%$ .
- (7.) In what time will a sum of money triple itself at  $2\frac{1}{2}\%$ ?
- (8.) At what rate will a sum of money double itself in 15 years?
- (9.) What principal will produce £17, 10s. from 1st December to 12th February at 5%?
- (10.) Find the interest on £968 for 7 years 7 months at  $5\frac{1}{2}\%$ .
- (11.) In what time will a sum of money double itself at  $1\frac{1}{4}\%$ ?
- (12.) At what rate per cent will a sum quadruple itself in 75 years?
- (13.) Find the interest on £967, 17s. 6d. for 7 mos. 146 days at  $6\frac{2}{3}\%$ .
- (14.) What principal will amount to £44, 3s.  $0\frac{1}{2}$ d. in 2½ years at  $3\frac{1}{2}\%$  per annum?
- (15.) At what rate per cent per annum will the simple interest on £500 amount to £67, 10s. in 1½ years?
- (16.) What interest will £2294, 18s. 9d. produce in 2 years 115 days at 5%?
- (17.) Find the simple interest on £127, 9s.  $4\frac{1}{2}$ d. at  $3\frac{1}{2}\%$  for 4 years 2 months.
- (18.) Find the sum of money that will amount to £350, 19s.  $4\frac{1}{2}$ d. in 6½ years at  $4\frac{1}{2}\%$ .
- (19.) A person puts out £1250 to interest at  $4\frac{1}{4}\%$ ; what annual income does he derive from it?
- (20.) In 2 years £250 put out to simple interest becomes £302, 10s.; what is the rate per cent per annum?
- (21.) What sum will amount to £5431, 15s.  $11\frac{1}{4}$ d. in 6 years at  $4\frac{1}{4}\%$ ?
- (22.) In what time will £91, 13s. 4d. amount to £105, 6s.  $0\frac{1}{2}$ d. at  $4\frac{1}{4}\%$ ?
- (23.) In how many years would £250 double itself at  $2\frac{1}{2}\%$ ?
- (24.) At what rate per cent will £520 amount to £754 in 9 years?
- (25.) Find the principal which will in 4½ years at  $4\frac{1}{2}\%$  amount to £962.
- (26.) What sum will amount to £105, 6s.  $0\frac{1}{2}$ d. in 3½ years at  $4\frac{1}{4}\%$ ?
- (27.) If £725 gain £141, 7s. 6d. in 12 years, what is the rate of interest per cent?
- (28.) If £880 amount to £899, 5s. at simple interest for  $\frac{7}{12}$  of a year, what must be the rate per cent?
- (29.) What sum of money put out at simple interest for 2½ years at  $3\frac{1}{2}\%$  will amount to £725, 9s.  $2\frac{1}{4}$ d.?
- (30.) Find the amount of £7234, 5s. at  $4\frac{1}{2}\%$  simple interest in  $22\frac{2}{3}$  yrs.
- (31.) The sum of £235 was lent on 1st of January, 1890, and the interest received was £4, 14s. When should the loan be repaid, reckoning money at  $2\frac{1}{2}\%$ ?
- (32.) A person receives 7s. 6d. as interest on £75 which he lent on 3d March; when should the money be repaid, reckoning money worth  $1\frac{1}{4}\%$ ?
- (33.) I borrowed £235 on 5th July, and I paid £2, 16s. 4d. as interest on it at  $2\frac{1}{2}\%$ ; on what date should I pay the debt?

- Q. One £1 is at interest at 5% which I borrowed on remittance 1951. At what date should I refund it, in half yearly words?

## PRESENT WORTH AND DISCOUNT.

The PRESENT WORTH or PRESENT VALUE of a sum of money is the sum of all the compound interest which will, with its interest, be given him at the given rate for the sum due. For example if £1000 in 1 month at 5% would amount to £1050. Therefore Present Worth of £1050 due in 1 month at 5% is £1000.

Therefore in order to find the present worth of a sum of money due in a given time we simply find what sum will give the given time at the given rate amount to the sum due.

Example.—Find the Present Value of £256, 10s. due in 4 years at 5%.

Find what £100 will amount to in 4 years at  $5\frac{1}{2}\%$ .

$$\text{Amount of } £100 = £114.$$

$$\text{The P.W. of } £114 = £100.$$

Required the P.W. of £256, 10s.  
As £100 : £256, 10s. :: P.W.

$$\begin{matrix} & 1 \\ \begin{matrix} 256 & 10 \\ 114 & 50 \end{matrix} & \begin{matrix} 114 \\ 57 \\ 28 \end{matrix} \end{matrix} = \text{Ans.} = £225.$$

DISCOUNT is the abatement made for the payment of a sum of money before it becomes due.

Since a sum of money due in a given time is discharged by the payment of its Present Worth, it is evident that the discount is the difference between the sum due and its Present Worth. Therefore to find the Discount we subtract the P.W. from the sum due.

We can also find the Discount in a similar way to that of finding the P.W. For example, find the Discount on Ex. 1.

Amount of £100 in 4 years at  $5\frac{1}{2}\% = £114$ , ∴ the discount £114 is £14. Required to find the discount on £256, 10s.

As £114 : £256, 10s. :: £14 : Discount.

$$\begin{matrix} & 7 \\ \begin{matrix} 256 & 10 \\ 114 & 50 \end{matrix} & \begin{matrix} 114 \\ 57 \\ 28 \end{matrix} \end{matrix} = \text{Ans.} = £31, 10s.$$

Discount thus calculated is called as True Discount.

## Exercise 14.

- (1.) Find the present value of £4375 due in  $6\frac{1}{4}$  years at 4% per annum.
- (2.) What is the present worth of £3367, 10s. due in  $3\frac{1}{2}$  years at  $3\frac{1}{2}\%$ ?
- (3.) Find the discount on £3733, 5s. 6d. due in 7 years at  $5\frac{1}{4}\%$ .
- (4.) Find the discount on £285, 14s. 3d. due in 4 years at  $3\frac{1}{2}\%$ .
- (5.) What is the present worth of £836 due in  $1\frac{1}{2}$  years at 4%?
- (6.) Find the present value of £192 due in 6 years 8 months at 3%.
- (7.) Find the discount on £678, 6s. 8d. due in 3 months at 7%.
- (8.) Find the present value of £392, 8s. 9d. due in 6 months at 8%.
- (9.) Find the discount on £95,062 due in 9 months at  $3\frac{1}{4}\%$ .
- (10.) Find the discount on £1387, 19s. 6d. due in 6 years 4 months at  $7\frac{1}{2}\%$ .
- (11.) Find the present worth of £3530, 10s. due in 8 months at  $3\frac{1}{2}\%$ .
- (12.) Find present value of £1375 due in 5 months at  $7\frac{1}{2}\%$ .
- (13.) Find the present value of £137, 6s. 8d. due in 292 days at  $3\frac{3}{4}\%$ .
- (14.) Find the discount on £1052, 13s. 6d. due in 1 year 73 days at  $2\frac{1}{4}\%$ .
- (15.) What is the discount on £4781, 1s. 3d. due in 225 days at  $2\frac{1}{2}\%$ ?
- (16.) Find the present value of £293, 14s. due in 17 days at  $12\frac{1}{2}\%$ .
- (17.) Find the present value of £467, 4s.  $4\frac{1}{2}$ d. due in 130 days at  $6\frac{6}{7}\%$ .
- (18.) Find the discount on £2060, 16s. 2d. due in  $3\frac{1}{2}$  years at  $3\frac{1}{2}\%$ .
- (19.) Find the discount on £520, 11s. 6d. due in 11 years at  $5\frac{1}{4}\%$ .
- (20.) Find the discount on £250 due in  $4\frac{1}{2}$  years at 6%.

## DISCOUNTING BILLS.

Merchants frequently make their payments by *Promissory Notes* or *Bills of Exchange*.

A Promissory Note is a written engagement in which one person promises to pay another a sum of money after the expiration of a certain time. It is drawn up as follows:—

Belfast, 1st January, 1893.

£500.

Three months after date, I promise to pay G. Wilson, or order, Five hundred pounds, value received.

J. Dodds.

A Bill of Exchange is a written order from one person to another to pay a sum of money after the expiration of a certain time. It is drawn up as follows:—

Cork, 1st January, 1893.

£500.

*Three months after date, pay A. Dent, or order, Five hundred pounds, value received.*

J. Dodds.

A bill of exchange or promissory note always runs 3 days beyond the time specified, and these days are called *days of grace*.

Bill-discounters and bankers calculate discount as *interest* on the sum specified, whereas it should be, properly speaking, the interest of the present worth of that sum.

Discount thus calculated is known as *False, Mercantile, or Commercial Discount*.

### DISCOUNT.

Mercantile Discount is the interest on the sum due. True Discount is the interest on the true present worth,  $\therefore$  the mercantile discount is greater than the true discount by the interest on the true discount. The excess of the false discount over the true is called the banker's gain.

*N.B.*—In the solution of questions on discount the mercantile is always meant unless the true is specially mentioned.

Example:—A bill for £808 is drawn on the 7th May at 5 months and discounted on 29th July at 5%: find the discount.

The bill becomes due on 10th October.

$$\begin{array}{r} \text{July } 2 \\ \text{Aug. } 31 \\ \text{Sept. } 30 \\ \text{Oct. } 10 \end{array} \quad \begin{array}{l} \text{Discount} = \frac{808 \times \frac{1}{5} \times 5}{100} = \text{£}8, 1\text{s. } 7\frac{1}{2}\text{d.} \\ \text{Ans.} = \text{£}8, 1\text{s. } 7\frac{1}{2}\text{d.} \\ \hline 73 \text{ days} = \frac{1}{5} \text{ year.} \end{array}$$

The true discount in this example would amount to £8. The banker's gain would therefore be 1s. 7½d.

The ordinary or mercantile present worth is found by subtracting the discount from the amount of the bill.

### Exercise 15.

- (1) Find the banker's discount on a bill for £250, drawn on March 27th at 6 months and discounted on July 19th at 4½%.
- (2) What is the ordinary discount upon a bill of exchange for £150, drawn on January 25th at 9 months and discounted on March 23d at 8%?
- (3) Find the discount on a bill for £1750, drawn on Dec. 3d, 1891, for 3 months and discounted on Jan. 16th, 1892, at 4¾%.
- (4) Find the difference between the true and the ordinary discount on a bill for £300, due on August 30th, 1892, and discounted on January 27th, 1892, at 2½%.
- (5) Compare the true with the banker's discount on a bill of £275, due on November 24th, 1888, and discounted on February 9th of the same year at 5%.

- (6.) Find the mercantile discount on a bill for £474, 10s., drawn on 25th June at 6 months and discounted on Sept. 19th at 8%.
  - (7.) Find the present worth of £314, 17s., drawn on 2d April at 5 months and discounted on 22d June at 3½%.
  - (8.) Find the discount on £135, drawn on 11th Dec. at 3 months and discounted on 13th January at 3½%.
  - (9.) Find the true present worth of £240, drawn on the 14th May at 4 months and discounted on 3d August at 3¼%.
  - (10.) Find the ordinary discount on a bill for £1053, 7s., drawn on 17th November at 3 months and discounted on 13th December at 4%.
  - (11.) Find the present worth of a bill for £1500, drawn on 3d March at 3 months and discounted on the 21st March at 3%.
  - (12.) Find the discount on £2000, drawn on 28th Feb. at 6 months and discounted on 21st July at 2½%.
  - (13.) Find the true present worth of £3141, 1s., drawn on 30th December at 5 months and discounted on 10th January at 3½%.
  - (14.) Find the present worth of a bill for £567, 17s. 3d., drawn on 31st May at 7 months and discounted on 4th August at 2½%.
  - (15.) Find the discount on a bill for £3000, drawn on 18th June at 4 months and discounted on 1st September at 3%.
  - (16.) Find the true discount on a bill for £1008, 7s. 4d., drawn on 15th July at 12 months and discounted on 22d Dec. at 10%.
  - (17.) Find the present worth of a bill for £1781, 15s., drawn on 31st July at 8 months and discounted on 29th August at 3%.
  - (18.) A 3 months' bill for £98, 15s. 4d. was drawn on 4th August and discounted on 28th of the same month at 5%: find the discount.
  - (19.) Find the true discount on a bill for £157, 8s. 6d., drawn on 2d April at 5 months and discounted on 22d June at 3½%.
  - (20.) A bill for £67, 10s. was drawn on 11th December at 3 months and discounted on 13th January at 3½%: find the true present worth.
- 

## EXTRACTION OF THE SQUARE ROOT.

The *square* of any given number is obtained by multiplying the number by itself. For example, the square of 4 is  $4 \times 4 = 16$ .

The *Square Root* of any given number is that number which, if raised to the second power, will be equal to the number itself. Thus 4 is the square root of 16, and 9 is the square root of 81.

The sign of the square root is  $\sqrt{\phantom{x}}$ , but the 2 is generally omitted, and consequently it becomes  $\sqrt{\phantom{x}}$ . Rule with an example.

Example 1 :—Find the value of  $\sqrt{225.9009}$ .

Beginning at the decimal point mark off the figures both to the right and left into periods of 2 figures each. Find the highest number (1) whose square does not exceed the left-hand period (2), and write this number as the first root figure; subtract its square (1) from that period (2), and to the remainder (1) annex the next period (25) for dividend; double the part of the root already found for divisor, and determine how often it (2) is contained in the dividend, omitting the right-hand figure (5) of the latter; annex the quotient number thus found (5) to the partial divisor, and multiply the new divisor (25) by this number (5). Subtract and bring down the next period as a new dividend, and for a new trial divisor add the last figure in the quotient to the previous divisor. Proceed in the way indicated above until all the periods are brought down, not forgetting to put the decimal point in its proper place.

$$\begin{array}{r} 15.08 \\ 225.9009 \\ \underline{-25} \\ 1 + + \\ 125 \\ \underline{-125} \\ 9009 \\ 3003 \quad \underline{9009} \end{array}$$

*Ans. = 15.08.*

### Exercise 16.

Extract the Square Root of the following numbers :—

|            |             |               |               |
|------------|-------------|---------------|---------------|
| (1.) 4624. | (7.) 676.   | (13.) 181044. | (19.) 197136. |
| (2.) 5776. | (8.) 1296.  | (14.) 313800. | (20.) 91809.  |
| (3.) 1521. | (9.) 9025.  | (15.) 61504.  | (21.) 164025. |
| (4.) 2209. | (10.) 4096. | (16.) 126736. | (22.) 136900. |
| (6.) 3136. | (11.) 2809. | (17.) 119025. | (23.) 50625.  |
| (6.) 6084. | (12.) 2025. | (18.) 40401.  | (24.) 102400. |

Find the value of the following :—

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| (25.) $\sqrt{1522756}$ .       | (33.) $\sqrt{16281225}$ .      | (41.) $\sqrt{36844900}$ .      |
| (26.) $\sqrt{1060900}$ .       | (34.) $\sqrt{1758276}$ .       | (42.) $\sqrt{26040609}$ .      |
| (27.) $\sqrt{11641744}$ .      | (35.) $\sqrt{16483600}$ .      | (43.) $\sqrt{12960000}$ .      |
| (28.) $\sqrt{11580409}$ .      | (36.) $\sqrt{25120144}$ .      | (44.) $\sqrt{1635717136}$ .    |
| (29.) $\sqrt[3]{257089156}$ .  | (37.) $\sqrt[3]{659359684}$ .  | (45.) $\sqrt[3]{283753449}$ .  |
| (30.) $\sqrt[3]{453775204}$ .  | (38.) $\sqrt[3]{1609855129}$ . | (46.) $\sqrt[3]{30858025}$ .   |
| (31.) $\sqrt[3]{1156816144}$ . | (39.) $\sqrt[3]{1111088889}$ . | (47.) $\sqrt[3]{1347770944}$ . |
| (32.) $\sqrt[3]{152399025}$ .  | (40.) $\sqrt[3]{1624573636}$ . | (48.) $\sqrt[3]{442471225}$ .  |

## Exercise 17.

I the Square Root of :—

|            |                    |                  |
|------------|--------------------|------------------|
| 3·7156.    | (11.) 901·140361.  | (21.) 25·439.    |
| ·5649.     | (12.) 246412·96.   | (22.) 6·249.     |
| ·7584.     | (13.) 144·600625.  | (23.) ·49674304. |
| 0·1.       | (14.) 4·34027.     | (24.) ·0009.     |
| 64·446281. | (15.) 3·687.       | (25.) ·0016.     |
| ·0881.     | (16.) 9·054081.    | (26.) ·00255025. |
| 47·0096.   | (17.) ·0043046721. | (27.) ·1.        |
| ·182169.   | (18.) 5·0625.      | (28.) ·01.       |
| 027.       | (19.) 177·7.       | (29.) ·001.      |
| 1922·2489. | (20.) ·0036372961. | (30.) ·1079521.  |

Ind the Square Root of Vulgar Fractions.

If the denominator of the fraction have an exact root, the : Extract the sq. root of the numerator and denominator tely.

ixed number must first be reduced to an improper fraction applying the above rule.

If the denominator have *not* an exact root, the simplest l is to reduce the fraction to a decimal and extract the root ady explained.

## Exercise 18.

I the sq. rt. of each of the following :—

|                                  |   |  |
|----------------------------------|---|--|
| 1 $\frac{1}{2}$ .                | (11.) 534 $\frac{9}{16}$ .                | (21.) 107 $\frac{5}{16}$ .                               |
| 12 $\frac{1}{4}$ .               | (12.) 2748 $\frac{47}{64}$ .              | (22.) 2660 $\frac{31}{64}$ .                             |
| 2 $\frac{1}{2}$ .                | (13.) 71 $\frac{1}{2}$ $\frac{1}{4}$ .    | (23.) 3141 $\frac{3}{4}$ $\frac{1}{4}$ .                 |
| 1 $\frac{1}{2}$ $\frac{9}{16}$ . | (14.) 639 $\frac{23}{64}$ .               | (24.) 8636 $\frac{1}{64}$ $\frac{9}{16}$ .               |
| 16 $\frac{3}{4}$ .               | (15.) 1352 $\frac{1}{2}$ $\frac{9}{16}$ . | (25.) 4803 $\frac{9}{16}$ .                              |
| 1 $\frac{1}{2}$ $\frac{1}{8}$ .  | (16.) 750 $\frac{1}{2}$ $\frac{1}{8}$ .   | (26.) 646482 $\frac{5}{8}$ $\frac{1}{16}$ .              |
| 7 $\frac{1}{2}$ $\frac{1}{16}$ . | (17.) 376 $\frac{9}{16}$ .                | (27.) 24508 $\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{4}$ . |
| 9 $\frac{1}{2}$ $\frac{9}{16}$ . | (18.) 1097 $\frac{1}{4}$ $\frac{1}{16}$ . | (28.) 5632 $\frac{5}{8}$ $\frac{1}{16}$ $\frac{9}{16}$ . |
| 36 $\frac{3}{4}$ .               | (19.) 788 $\frac{1}{2}$ $\frac{9}{16}$ .  | (29.) 2214 $\frac{1}{2}$ $\frac{1}{16}$ $\frac{9}{16}$ . |
| 7 $\frac{1}{2}$ .                | (20.) 1879 $\frac{1}{2}$ $\frac{9}{16}$ . | (30.) 3607 $\frac{5}{8}$ $\frac{9}{16}$ .                |

EXAMINATION QUESTIONS FOR VI<sup>1</sup>.

## SET I.

## Exercise 20.

## A.

ress  $\frac{7}{10}$  of a rood as the decimal of  $\frac{1}{16}$  of an acre.

at principal will gain £285, 12s. in  $1\frac{1}{2}$  years at  $4\frac{1}{2}\%$ ?

ide the sum of  $2\frac{1}{2}$  and  $2\frac{5}{8}$  by their difference.

- (1) Find the price of 62 tons 7 cwt., 2 qrs. at £12. per ton.  
 (2) Find the value of '081640625 of £500.  
 (3) If 40 horses plough 48 acres 2 roods in 23 days. How many would 16 horses plough in  $8\frac{1}{2}$  days?

## B.

- (1) If 120 men do a piece of work in 35 days at 2 hours - how many days would 150 men do the same work if they were only 7 hours long?  
 (2) Find the discount on a nine months' bill for £598 due 1st Aug. and discounted on 18th Feb. at  $2\frac{1}{2}\%$ .  
 (3) Find the interest on £1018, 1s. for 2 years and 7 months at 4%.  
 (4) If one penny weighs 175 grains, how many could be made in a pound of copper weighing 6 lbs. Avoirdupois?  
 (5) Multiply the difference between 1.598 and 1.37508 by  $3\frac{1}{2}$ .

## C.

- (1) Find the price of 1 lb. when  $8\frac{1}{2}$  lbs. cost 14s.  
 (2) Find the interest on 457, 19s. 4d. for 150 days at  $4\frac{1}{2}\%$ .  
 (3) Divide £1 by '001.  
 (4) Add together  $27\frac{1}{2}$  of a ton and  $\frac{1}{10}$  of a cwt., and give answer in cwts. qrs. and lbs.  
 (5) After working an exercise in division you find the quotient 48. You discover, however, that your divisor was two great as it should be. Find the true quotient.  
 (6) Find the true amount on £1022 for 2 years at 6%.

## D.

- (1) Subtract the  $\frac{1}{4}$  of a guinea from  $\frac{1}{2}$  of £1, and express the result as the fraction of £1.  
 (2) In how many years would £5 become £10 at  $2\frac{1}{2}\%$ ?  
 (3) From 7 take  $47\frac{1}{2}$ , and divide the result by '875.  
 (4) If the  $\frac{1}{4}$  of a crew do a piece of work in 24 days, when the  $\frac{1}{2}$  of the crew do it?  
 (5) If 920 lbs. can be carried 10 miles for £5, find the cost of carrying 920 lbs. for 2 miles at the same rate.  
 (6) Simplify  $\frac{1}{2} \times \left( \frac{1}{2} - \left( \frac{1}{2} - \frac{1}{2} \right) \right)$ .

## E.

- (1) Subtract the product of  $\frac{1}{2}$  and  $\frac{1}{3}$  from their sum.  
 (2) Find the price of 12 tons 3 cwt., 3 qrs. 4 lbs. at £4, 15s. per ton.  
 (3) In what time would £400 amount to £560 at  $4\frac{1}{2}\%$ ?  
 (4) In an exercise in division the quotient is  $\frac{1}{2}$  and the dividend 12. Find the divisor.

- (5.) Find the interest on £901, 5s. for  $1\frac{3}{4}$  years at 3%.  
 (6.) Find the mercantile discount on a 3 months' bill for £200 drawn on 1st May and discounted on 2d June at 3%.

## F.

- (1.) If the '3 of an estate were worth £500, what would '875 of it be worth?  
 (2.) If  $8\frac{1}{2}$  cwts. cost £35, 12s., find the cost of  $3\frac{1}{2}$  qrs.  
 (3.) Find the value of  $\frac{2\frac{2}{3}}{9\frac{5}{8}} \text{ of } \frac{5\frac{7}{8}}{8}$  of £5.  
 (4.) In what time would £362 amount to £407, 5s. at 4%?  
 (5.) Express as a vulgar fraction in its lowest terms the product of  $\frac{5}{6}$  and  $\frac{7}{8}$ .  
 (6.) Find the missing term :—As  $3\frac{2}{3} : ? :: 12\frac{1}{2} : 3\frac{1}{2}$ .

## G.

- (1.) A bankrupt owes one man £1600, and another £1800. How much can he pay each if he only possesses £544?  
 (2.)  $\sqrt[3]{0162078}$  to five places.  
 (3.) Find the interest on £214, 10s. 8d. from 3d October, 1883, to 15th March, 1884, at 4%.  
 (4.) A can do a piece of work in 3 days, B in 4 days, and C in 5 days. When would they do it, all working together?  
 (5.) If 1 mile (English) cost £39, 7s. 6d., find the cost of 20 miles 5 fur. 22 yards (Irish).  
 (6.) Add together '875 of a ton and  $\frac{3}{4}\frac{1}{2}$  of a cwt., and give your answer in cwts. qrs. and lbs.

## H.

- (1.) Multiply 15 cwts. 2qrs. 8 lbs. by  $3\frac{1}{2}$ .  
 (2.) Find the interest on £3729 for 22 days at 5%.  
 (3.) Divide '3076 by 85.92 to 6 places.  
 (4.) If 40 tons be carried 15 miles for £2, 5s., how far would 1 ton be carried for £3, 5s.?  
 (5.) If a man fails to the amount of £3076, and can only pay 9s. 8d. in the £, find the amount of his assets.  
 (6.) Multiply '0875 by '075.

## I.

- (1.) Reduce 837 Irish acres to English acres.  
 (2.) After paying an income-tax of 9d. in the £ a man has £535, 10s. 6d. left. Find his gross income.  
 (3.) At what rate per cent will £157, 15s. amount to £276, 1s. 3d. in 15 years?  
 (4.)  $\sqrt[3]{0013627}$  to 7 places.  
 (5.) Divide '028 by 92.5.  
 (6.) Express  $\frac{2}{3}$  of  $\frac{9}{10}$  of 3s. 4d. as the fraction of a guinea.

## J.

- (1.) A person leaves £240, 10s. in the bank for 18 months, and at the end of that time the banker adds £8, 0s. 4d. to it as interest. What rate per cent did he allow?
- (2.) Find the true discount on a bill for £250, due in 70 days at 4%.
- (3.) If 70 yards of cloth 25 inches wide cost £6, 7s. 6d., find the cost of 50 yards 20 inches wide.
- (4.) A complex fraction which when reduced to its simplest form =; has  $3\frac{1}{2}$  for numerator; find the denominator.
- (5.) Find the price of 315 yards 2 qrs. 2 nla. at 6s. 4d. per yd.
- (6.) Simplify  $\frac{00379}{.09}$ .

## K.

- (1.) Find the interest on £350, 0s. 9d. for 39 days at  $2\frac{3}{4}\%$ .
- (2.) Express 13s. 9d. as the decimal of £3.
- (3.) How many weights of 10 grains each would be equal to 8 oz. (Avoir.)?
- (4.) Define measure and multiple.
- (5.) A bankrupt owes £1537, 3s. 4d., but can only pay £960, 14s. 7d. How much can he pay in the £?
- (6.) Multiply .39275 by 87.63.

## L.

- (1.) Find the interest on £540 from 17th June to 5th Sept. at 4%.
- (2.) After paying an income-tax of 7d. in the £, a man has £218, 8s. 9d. left. Find his gross income.
- (3.)  $\sqrt[3]{36.2}$ .
- (4.) A person owns  $\frac{3}{8}$  of an estate, and he sells the  $\frac{1}{2}$  of his share for £2000. Find the value of the whole estate.
- (5.) Add together 2.8, .098, 95.73, 14.0096, and 80.
- (6.) In an exercise in subtraction suppose you are told the remainder and half the minuend, how would you find the subtrahend?

## M.

- (1.) Express 15 as an improper fraction, having 13 for denominator.
- (2.) Express  $\frac{1}{3}$  of £2, 0s. 6d. as a decimal of £1.
- (3.) If  $7\frac{1}{2}$  ozs. of tea cost 2s. 6d., find the cost of  $5\frac{1}{2}$  lbs.
- (4.) Find the interest on £13.076 for 50 days at 5%.
- (5.)  $.3946 \times 3.027$ .
- (6.) Multiply  $5\frac{1}{2}$  by  $(3\frac{1}{2} \div 2\frac{3}{4})$ .

## N.

- (1.) Multiply  $3\frac{1}{2}$  by  $2\frac{1}{4}$ , and divide the product by  $1\frac{1}{2}$ .
- (2.) Find the true discount on a bill for £739, due in 80 days at 5%.
- (3.) If 15 men can mow 30 acres of corn in 15 days, how many men can mow 12 acres in 5 days?

- (1.) Divide .021 by .000021.
- (2.)  $\sqrt[3]{3.3}$  to 4 places of decimals.
- (3.) Find the interest on £281, 4s. from 9th August to 3d Jan. at 5%.

O.

- (1.) Find the discount on a 9 months' bill for £570, dated the 12th April, and discounted on 7th July at  $2\frac{1}{2}\%$ .
- (2.) A bankrupt owes one man £3250, to another £350, and his assets are £1000. How much can he pay in the £?
- (3.) Extract the square root of .07 to 5 places.
- (4.) Simplify  $\frac{4\frac{4}{15}}{5\frac{1}{2} - 4\frac{1}{2}}$ .
- (5.) After deducting from my salary an income-tax of 8d. in the £, my net income is £472, 1s. 3d. What is my gross salary?
- (6.) Divide 2.2 by .02.

P.

- (1.) Find the Int. on £350 for  $\frac{1}{2}$  of a year at  $4\frac{1}{2}\%$ .
- (2.) If  $\frac{1}{2}$  of the money is taken out of a purse and there is 12s. 6d. remaining, how much was there in it at first?
- (3.) Divide  $15\frac{3}{8}$  by  $3\frac{3}{5}$ .
- (4.) Find the cost of 5 ozs. 8 dwts. 8 grs. at 2s. 6d. per oz.
- (5.) Simplify  $\frac{8.316}{2} \times \frac{2}{3}$  of .07.
- (6.) If 60 men do a piece of work in 10 days, working 9 hrs. per day, in how many days would 10 men do it, working 6 hours a day?

Q.

- (1.) Divide 38.207 by 3.0265.
- (2.) Find cost of 35 acres 3 rds. 10 per. at £3, 11s. 6d. per ac.
- (3.) Find the interest on £279 for 219 days at 3%.
- (4.) Extract the square root of .003.
- (5.) Find the price of 18 cwts. 2 qrs.  $13\frac{1}{2}$  lbs. at £1, 2s. 6d. per cwt.
- (6.) Divide the difference between .007 and .07 by .32.

R.

- (1.) The value of a ratio is  $1\frac{2}{3}$  and the antecedent is 15; find the consequent.
- (2.) Find the price of 15 cwts. 2 qrs. 13 lbs. 14 ozs. at £5, 5s.  $4\frac{3}{4}$ d. per cwt.
- (3.) A person lost  $\frac{2}{3}$  of his money and had 5s. left; how much had he at first?
- (4.) Find the value of .00786 of a ton.
- (5.) Find the true discount on £832, 10s. for 6 months at 5%.
- (6.) Find the interest on £35 for 73 days at 5%.

## S.

- (1.) Reduce  $\frac{1}{2}$  of £23, 14s. 10d. to the fraction of £2, 3s. 2d.  
 (2.) Find the interest on £1125, 8s. 4d. for 146 days at 5%.  
 (3.) Multiply the difference between '001 and '0001 by 1000.  
 (4.) If 340 yards 5 inches cost £51, 0s. 5d., what will  $7\frac{1}{2}$  yds. cost?  
 (5.) If 18 boys earn £16 in 17 dys., what will they earn in  $\frac{1}{3}$  of a day?  
 (6.) Find the value of  $\frac{1}{2}$  of '475 of an hour +  $\frac{1}{15}$  of 45·3 of a minute.

## T.

- (1.) Find the simple interest on £520 for  $4\frac{1}{2}$  yrs. at 5%.  
 (2.) If  $\frac{1}{2}$  of a ton cost £22, 15s., what would  $\frac{1}{8}$  cwt. cost?  
 (3.) Divide '00270 by 3·01.  
 (4.) If a man travel 312 yards in  $\frac{1}{2}$  min., how far would he travel in  $31\frac{1}{2}$  mins.?  
 (5.) Reduce 7 lbs. to the fraction of  $8\frac{1}{2}$  stones.  
 (6.) Find the interest on £1036, 10s. for  $2\frac{1}{2}$  yrs. at 4 $\frac{1}{2}\%$ .

## U.

- (1.) Multiply 408·75 by the difference between 8·75 and 875.  
 (2.) If the  $\frac{1}{2}$  of a mile cost £1345, 6s. 3d. to make, what does it cost per mile?  
 (3.) Simplify  $\frac{1}{2} + 3\frac{1}{4} - (\frac{1}{2} \div 4)$ .  
 (4.) Add ('03 + '075 + '9) of 1 mile to  $\frac{1}{4}\frac{1}{2}$  of a mile.  
 (5.) If 1·75 of a ton costs £7, 15s., what should 2·5 cwts. cost?  
 (6.) If 72 men earn £48 in 3 days, what would 360 men earn in the same time?

## V.

- (1.) How often are  $3\frac{1}{2}$  ozs. contained in  $3\frac{1}{2}\frac{1}{2}$  lbs.?  
 (2.) Find the difference between '5 of '5 of 1 mile and '75 of '75 of 1 mile. (Answer in yards.)  
 (3.) If  $5\frac{1}{2}$  tons be carried 90 miles for £3, 7s. 6d., how far should  $5\frac{1}{2}$  stones be carried for the same money?  
 (4.) A train travels 40 miles in 80 minutes, how far will it travel in 10 seconds?  
 (5.) Reduce  $13\frac{1}{2}$  pints to the fraction of 30 $\frac{1}{2}$  pinta.  
 (6.) Take '054  $\times$  '06 from  $(1\cdot62 \div '0054)$ .

## W.

- (1.) Find the difference between  $3\frac{1}{2}$  of '003 and  $6\frac{1}{2}$  of '0011.  
 (2.) A man pays £44, 14s. 10d. a year as income-tax at the rate of 14d. in the £. Find his gross income.  
 (3.) Find the discount on a 5 months' bill for £265 drawn on 26th May and discounted on the same day at 3 $\frac{1}{2}\%$ .  
 (4.) If  $2\frac{1}{2}$  ozs. cost 1s. 3d., find the cost of 8 lbs. 5 oza.  
 (5.) If a man gains £8 in 5 months with a capital of £1000, in what time will he gain £40 with a capital of £3500?  
 (6.) Find the L.C.M. of 82, 75, 36.

## X.

- (1.) Two numbers are to each other as 12:14; the smaller one is 27·021. Find the greater.
- (2.) A man has a gross income of £500 a year. How much has he left after paying an income-tax of 4d. in the £?
- (3.) A can do a piece of work in 5 days, B in 6 days, and C in 7 days. In what time could they do it working together?
- (4.) Show that the ratio of 6:5 is less than the ratio of 5:4.
- (5.) Divide £3000 between A, B, and C; giving A  $\frac{2}{3}$ , B  $\frac{1}{3}$ , and C the remainder.
- (6.) What principal would gain £50 in  $2\frac{1}{2}$  yrs. at 5%?

## Y.

- (1.) A person gives 375 of his property to one person and the  $\frac{1}{3}$  to another. Find the value of the remainder, the whole being £6000.
- (2.) At what rate per cent will £80 amount to £140 in 25 years?
- (3.) In what time would 30 men do a piece of work which 45 boys could do in 12 days. If 2 men = 3 boys.
- (4.) Find the discount on a 3 months' bill for £240, drawn on 3d Aug. and discounted on 9th Sept. at 5%.
- (5.) What principal would produce £5 as interest in 20 days at 10%?
- (6.) If a train runs  $\frac{1}{2}$  of a mile in  $\frac{1}{3}$  of a minute, what distance will it run in  $\frac{1}{2}$  of an hour?

## Z.

- (1.) If the  $1\frac{1}{2}$  of a sum of money is equal to the  $\frac{2}{3}$  of 11s. 8d., find the sum.
  - (2.) Add 38·25 sq. ft. to 39·3 sq. feet and find the value of the total at 3s. 6d. per sq. foot.
  - (3.) Given the divisor, quotient, and remainder, how do you find the dividend?
  - (4.) What sum must be added to  $3\frac{1}{2}$  so that  $\frac{1}{2}$  of the total may be  $6\frac{1}{2}$ ?
  - (5.) How much may a person spend in 73 days if he wish to save £105 a year, his annual income being £600?
  - (6.) If income-tax be increased from 4d. to 6d. in the £, how much more will a person who has an income of £3000 a year have to pay?
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## SET II.

## A 2.

- (1.) Find (1) the product, (2) the quotient of .36 by .00828.
- (2.) At what rate per cent will £850 double itself in 15 years?
- (3.) The value of a ratio is  $8\frac{1}{2}$ , and the consequent is  $13\frac{3}{8}$ ; find the antecedent.

- (a) Find the banker's discount on £115, due in 73 days at  $\frac{21}{2}\%$ .  
 (b) How many men could do a piece of work in  $11\frac{1}{3}$  days which  
     10 men could do in  $2\frac{1}{2}$  days?  
 (c) Divide £300 between A, B, and C, in the proportion of  $25:12$   
     and 1.

132.

- (c) What number bears the same ratio to 226 that  $17\frac{1}{2}$  does to  $37\frac{1}{2}$ ?  
 Ans. 202.

(d) Find the commercial present worth of £900, due in 219 days at  $5\frac{1}{2}\%$ .

(e) Find the G.C.M. of 109037 and 66429; and also the L.C.M. of  
 11, 13, 17, and 96.

(f) Add together 10, 101246, 1033, and 8.22, and divide the result  
 by 10.24.

(g) If 142 yards cost £8.005d., find the value of 42 yards.

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- (a) Find the value of  $\sqrt{31.5}$ .  
 (b) What number bears the same ratio to 31.5 that 19 bears to 63?  
 (c) Find the difference between the true and commercial discount on  
 a bill drawn on the 10th July at 5 months, and discounted  
 on the 1st October at 1%.  
 (d) Simplify  $\frac{1 - x}{1 + x}$ .  
 (e) What is the sum of  $\frac{1}{4}$  of a guinea,  $\frac{1}{2}$  of a crown, and 2½d.?  
 (f) Find the value of 10<sup>12</sup> of change at £2, 16s. 6½d. each.

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- (1) Express as decimal -  $\frac{1}{2}$ ,  $\frac{1}{3}\frac{1}{4}$ , and  $3\frac{1}{4}$ .

(2) Reduce  $\frac{1}{2} \text{ £ } \frac{1}{3} \text{ s. } \frac{1}{4} \text{ d.}$  of 3 hours to the decimal of £20.

(3) If a man receive £18. 10s. wages for 12 days' work, what will be the wages of 10 men for 20 days' work?

(4) If the sum upon interest of £183. 10s. amounts to £133. 13s. 1½d., how much is that in the £?

(5) What principal will gain £200. 1s. 7½d. in 3 yrs. at the same rate by which £100. 10s. amounts to £36. 17s. 6d. in 5 years?

(6) Divide £1000 between A, B and C in the ratio of 5, 9, and 6.

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- (1) Find the absent term in the following proportion :—  
 $17\frac{1}{2} : 59\frac{1}{2} :: ? : 119\frac{1}{2}$ .

(2) Find the true discount on a bill of £397, 2s., due half a year hence at 5%.

(3) Find the value of  $\frac{23 + 5\frac{1}{2} + 8\frac{1}{4}}{12 \times \frac{1}{2}}$ .

- (4.) Find the interest on £100 for 1 year, when £936, 13s. 4d. amounts to £1157, 7s. 4½d. in 4½ years.  
 (5.) What are a man's wages for a year and 48 days at £1, 3s. 2½d. a week?  
 (6.) Find the banker's discount on a bill for £300, drawn on 3d of May at 5 months and discounted on 17th June at 5%.

## F2.

- (1.) Simplify  $\frac{5\frac{2}{3}}{7\frac{1}{2}}$  of  $\frac{21.25}{0.46875}$   
 (2.) A bankrupt fails in £9619, 14s. 6d., and his assets amount to £1603, 5s. 9d. How much can he pay in the £?  
 (3.) What decimal of £1 is 8·4 pence?  
 (4.) At what rate per cent would £50 amount to £75 in 5 years?  
 (5.) Find the true discount on a bill of £698, 17s. 8½d., due in 1 year 7 months at 4½%.  
 (6.) How many horses would be required to plough 182 acres of land in 35 days if 10 horses can plough 18 acres in 7 days?

## G2.

- (1.) Simplify  $\frac{2 + (\frac{1}{6} \text{ of } 5\frac{1}{2})}{\frac{5}{6} \text{ of } \frac{1}{2}}$ .  
 (2.) If  $3\frac{1}{2}$  lbs. cost 8½s., what will  $97\frac{5}{8}$  lbs. cost?  
 (3.) If the expenses of 7 persons for 3 months amount to 70 guineas, what will be the expenditure of 10 persons for 12 months?  
 (4.) How do you find the value of a ratio? Find the value of  $16\cdot5 : 00033$ .  
 (5.) Find the true discount at 4½% on £587, 18s. 9d., due 6 months hence.  
 (6.) What principal will amount to £1000 in 5 years at 5%?

## H2.

- (1.) Find the mercantile discount on a bill of £800, due in 73 days at 2½%.  
 (2.) Two numbers are as 6 : 7. The greater one being 27·02, find the less.  
 (3.) Find the value of  $34 - \frac{3}{5} \text{ of } 5\frac{1}{2} \text{ of } \frac{3}{4} \text{ of } 17$ .  
 (4.) If a tradesman with a capital of £2000 gain £50 in 3 months, what sum will he gain with a capital of £9000 in a year and 2 months?  
 (5.) Find the simple interest on £41, 13s. 4d. for 8 months at 4½%.  
 (6.) What decimal of  $1\frac{1}{2}$  guineas is £6, 12s. 6½d.?

## I2.

- (1.) Find the amount of £435, 10s. in  $5\frac{1}{2}$  years at 3½%.  
 (2.) If £675 gain £33, 15s. in 12 months, how much will £480 gain in 15 months?

- (a.) Reduce 2 weeks  $6\frac{1}{2}$  days to the decimal of 4 days 3 hours.
- (4.) A grocer buys 272 lbs. of tea at 2s.  $2\frac{1}{2}$ d. a lb., and then sells it at 2s. 6d. a lb. What does he gain by the transaction?
- (5.) If a family of 9 persons spend £480 in 8 months, how much will serve a family of 24 persons 16 months?
- (6.) Find the true present value of £324, 6s.  $1\frac{1}{2}$ d., due in 2 years 9 months hence at  $3\frac{1}{2}\%$ .

## J 2.

- (1.) Define discount, and find the true discount on a bill of £10, due at the end of a year at 10%.
- (2.) If  $\frac{1}{2}$ d. be the interest on 1s. for a calendar month, what is the rate per cent per annum?
- (3.) Simplify  $3\frac{1}{2} \times 5\frac{1}{2} + \frac{2}{3}$  of  $(6\frac{1}{2} - 1\frac{1}{2})$  and subtract  $2\frac{1}{2} \div \frac{2}{3}$  from the result.
- (4.) Find the difference between  $3\frac{1}{2}$  of 2 qrs. 25 lbs. and  $2\frac{1}{2}$  of 4 cwts. 2 qrs. 20 lbs.
- (5.) If 27 men build 54 rods of a wall in 26 days, how many rods will 32 men build in 39 days?
- (6.) Multiply .3075 by 1.072, and divide the result by .008.

## K 2.

- (1.) The price of .0625 lbs. of coffee being .4583s., what is the cost of .075 of a ton?
- (2.) Find the amount which must be put out at interest to produce £30 a year at 4%.
- (3.) If a ship's crew of 500 men have food for 48 days, at the rate of 27 ozs. per man per day, how many men will the same provisions serve for 60 days, allowing each man 30 ozs. per day?
- (4.) Find the difference between  $4\frac{1}{4}$  and  $3\frac{2}{7}$ , and multiply the result by  $(\frac{2}{3} \div 2\frac{1}{2})$ .
- (5.) Find the value of .3875 of a ton.
- (6.) The value of a ratio is 66.5; the antecedent is 9.5; find the consequent.

## L 2.

- (1.) Simplify  $\frac{.064 + 12.25}{.9375}$ .
- (2.) Divide 429 nuts among 4 boys in the proportion of 6, 7, 9, 11.
- (3.) Find the true discount on £237, 10s. paid 2 years before it becomes due at 7%.
- (4.) What principal will produce £30 in 9 years at  $2\frac{1}{2}\%$ ?
- (5.) Reduce the  $\frac{1}{3}$  of a perch to the fraction of an acre.  
— to B's as 5 : 6. The sum of their ages is 88. Find

## M2.

- (1.) If  $3\frac{9}{16}$  lbs. cost 17s. 9 $\frac{3}{4}$ d., what will be the value of  $17\frac{1}{16}$  lbs.?
- (2.) A parish is rated at £4368, 12s., and upon this amount a rate of 1s. 3d. in the £1 is levied; how much money is thus raised?
- (3.) If 30 cwts. is carried 15 miles for £5, 8s. 9d., how far ought 80 cwts. be carried for £29?
- (4.) Simplify  $\frac{3\frac{1}{4} + 2\frac{2}{7}}{3\frac{1}{2} \times 2\frac{2}{7}}$ .
- (5.) Find the amount of £3050, 10s. 6d. at 5% for  $3\frac{1}{2}$  years.
- (6.) Find the true discount on £793, 14s.  $10\frac{1}{2}$ d. due in 9 months hence at 4%.

## N2.

- (1.) In what time will £860 amount to £900 at  $1\frac{1}{2}\%$ ?
- (2.) What number bears the same ratio to  $15\frac{3}{4}$  that  $12\frac{1}{2}$  bears to 63?
- (3.) Divide £345, 10s. among 3 persons so that their shares shall be in the proportion of 5 : 6 : 7.
- (4.) If a train goes 126 miles in 3 hrs. 5 mins. 58 secs., in what time will it go 297 miles?
- (5.) Of a field  $\frac{1}{5}$  is meadow,  $\frac{2}{5}$  is arable, and the remainder is 1 ac. 3 rds. 26 per.; find the quantities of meadow and arable land.
- (6.) If I pay 1s. 3d. for 6 lbs. 14 ozs. of bread when wheat is 4s. 9d. per bus., what must I pay for 23 lbs. 12 oz. when wheat is 5s. 5d. per bus.?

## O2.

- (1.) Add together  $\frac{2}{3}$  of a crown,  $1\frac{5}{24}$  of a guinea,  $\frac{1}{3}$  of 18s. 6d., and  $41\frac{5}{6}$  of £1.
- (2.) A debt of £3, 17s. 6d. is paid in farthings; how many will be required? And what will be their aggregate weight if 8 farthings weigh 1 oz?
- (3.) A bill for gas being £5, 9s. 3d. when gas was 4s. 9d. per 1000 cubic feet, what will the bill amount to when the price is 6s. 3d. per 1000?
- (4.) Find the value of the following ratio:—15.9 : 58.3.
- (5.) How many lbs. Troy are equal to 144 lbs. Avoir.?
- (6.) Find the interest on £377, 13s. for 1 year 3 months at 5%.

## P2.

- (1.) If 4 men earn £7, 10s. in 10 days, how many men will earn 10 guineas in 7 days?
- (2.) Add together  $\frac{2}{7}$  of  $1\frac{5}{7}$  and  $\frac{1}{2}$  of  $1\frac{9}{14}$ .
- (3.) A table-spoon weighs 3 ozs. 10 dwts., and a tea-spoon weighs 15 dwts.; find the value of 7 table-spoons and a dozen tea-spoons at 6s. 6d. per oz.
- (4.) Find the interest on £1276, 8s. 4d. for  $19\frac{1}{2}$  years at 5%.
- (5.) Two numbers are in the ratio of 19 : 20, the less number is 209; find the greater.

- (a.) Find the true discount on a bill for £75, 0s. 1 $\frac{1}{2}$ d. due in 25 days at 7 $\frac{1}{2}\%$ .

Q2.

- (1.) If a family of 9 persons spend £120 in 8 months, how much will serve a family of 24 persons for 16 months?
- (2.) In what time will £225 amount to £256, 10s. at 3 $\frac{1}{2}\%$ ?
- (3.) What sum put out at 3 $\frac{1}{4}\%$  would produce £14 interest in 4 $\frac{1}{2}$  yrs?
- (4.) I spend 12 guineas in 35 days, and save £100 a year; what must I earn in the year?
- (5.) If 8 ozs. of sugar be worth ·5625s., what is the value of ·75 of a ton.
- (6.) Reduce  $\frac{1}{4}$  of 17s. 3 $\frac{1}{2}$ d. to the decimal of £1, 3s. 1 $\frac{1}{2}$ d.

R2.

- (1.) An income of £3827, 12s. 6d. is taxed at the rate of 7d. in the £1; how much clear income will remain?
- (2.) A bankrupt having £645, 5s. 3 $\frac{1}{2}$ d. left can pay 7s. 8 $\frac{1}{2}$ d. in the £. What is the amount of his debts?
- (3.) A certain quantity of provisions serves 1500 men for 12 weeks, at the rate of 1 $\frac{1}{2}$  lb. a day for each man. How long ought the same provisions maintain 2250 men at the rate of  $\frac{1}{2}$  lb. a day for each man?
- (4.) A farmer gave £43, 17s. 4d. for 28 sheep; 6 of them died. At what rate must he sell the rest to gain £3, 16s. by his bargain?
- (5.) What principal would produce £11, 17s. 9d. in 2 $\frac{1}{2}$  years at 4%?
- (6.)  $\sqrt{11\frac{1}{4}}$ .

S2.

- (1.) Find the simple interest and amount of £106, 13s. 4d. from June 15th to Sept. 18th at 4 $\frac{1}{2}\%$ .
- (2.) A franc = 9 $\frac{1}{2}$ d. Convert £6, 11s. 7 $\frac{1}{2}$ d. into French money.
- (3.) A house costs £3500 and lets for £130 a year. State in decimals the rate per cent per annum of interest it pays to the owner.
- (4.) A bankrupt's debts amount to £2000 and his property to £775; what will each of his creditors lose in the £?
- (5.) The sum of £463, 16s. is to be raised in a parish, the assessment of which is £6184; what is the rate in the £?
- (6.) A can do a piece of work in 10 days; A and B together could do it in 7 days. In what time could B do it alone?

T2.

- (1.) If  $\frac{7}{6}$  of  $\frac{8}{9}$  of an article cost £116, 2s. 6d., find the value of the whole.
- (2.) If 12 men, working 6 hours a day, do a piece of work in 10 days, how long will 45 men take, working 8 hours a day?
- (3.) The interest on £2750 in  $10\frac{1}{2}\%$ ; find the rate per cent.

- (4) In what time will £45 double itself at  $3\frac{1}{2}\%$ ?
- (5.) Simplify  $\left( \frac{3\frac{1}{2} + 1\frac{1}{2}}{3\frac{1}{2} - 1\frac{1}{2}} \div 3\frac{3}{4} \right) - \frac{1}{5}$ , and express the result as a decimal.
- (6.) After paying an income-tax of 8d. in the pound, a man's income was £541, 6s. 8d. What was his gross income?
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## PROPORTIONAL PARTS.

This is a variety of the Rule of Three applicable to the solution of different kinds of examples, the method of treating which will be best explained by the types of questions given below.

Example 1:—Divide 810 into 3 parts proportional to the numbers 18, 27, 45.

The method of working this kind of question is as follows:—

As the sum of the given numbers : each of them in turn :: the number to be divided : each of the required parts.

$$18 + 27 + 45 = 90.$$

$$\text{As } 90 : 18 :: 810 : 162.$$

$$\text{As } 90 : 27 :: 810 : 243.$$

$$\text{As } 90 : 45 :: 810 : 405.$$

$$\text{Ans.} = 162, 243, 405.$$

Example 2:—A, B, and C enter into partnership. A advances £350, B £500, and C £650. Their profit after a given time is £750. How should it be divided?

This is an example of what is generally known as *Simple Partnership*, and it is worked in an exactly similar way to Ex. 1 given above.

$$\text{£350} + \text{£500} + \text{£650} = \text{£1500}.$$

$$\text{As } \text{£1500} : \text{£350} :: \text{£750} : \text{£175} \text{ A's share.}$$

$$\text{As } \text{£1500} : \text{£500} :: \text{£750} : \text{£250} \text{ B's } ,$$

$$\text{As } \text{£1500} : \text{£650} :: \text{£750} : \text{£325} \text{ C's } ,$$

$$\text{Ans.} \begin{cases} \text{A's share} = \text{£175} \\ \text{B's } , = \text{£250} \\ \text{C's } , = \text{£325}. \end{cases}$$

Example 3:—A, B, and C rent a piece of pasture for £350. A puts on 20 cows for 4 months, B 30 cows for 5 months, and C 45 cows for 6 months. How much should each contribute?

This is an example of what is generally known as *Compound Partnership*, and is worked as follows:—

20 cows for 4 months is equivalent to 80 cows for 1 month.

|    |   |   |   |   |     |   |   |
|----|---|---|---|---|-----|---|---|
| 30 | " | 5 | " | " | 150 | " | " |
| 45 | " | 6 | " | " | 270 | " | " |

The question is now identical with one in Simple Partnership, since the times in each case are equal.

$$\text{sum of products} = 30 \cdot 150 - 270 = 510.$$

$$\text{As } 500 : 30 :: \text{£}500 : A's \text{ share} = \text{£}56.$$

$$\text{As } 500 : 150 :: \text{£}500 : B's \text{ share} = \text{£}105.$$

$$\text{As } 500 : 270 :: \text{£}500 : C's \text{ share} = \text{£}189.$$

$$\text{Ans. } A's \text{ share} = \text{£}56.$$

$$\text{Ans. } B's \text{ share} = \text{£}105.$$

$$\text{Ans. } C's \text{ share} = \text{£}189.$$

**Example 4:**—Divide £300 between A and B, so that A shall have 7 times as much as B.

$$\text{Suppose B's share} = 1.$$

$$\text{Then A's share} = 7.$$

$$7 - 1 = 6.$$

$$\text{As } 3 : 7 :: 300 : A's \text{ share} = \text{£}700.$$

$$3 : 1 :: 300 : B's \text{ share} = \text{£}100.$$

$$\text{Ans. } A's \text{ share} = \text{£}700.$$

$$\text{Ans. } B's \text{ share} = \text{£}100.$$

### Exercise 22.

- (1.) Divide 429 apples among four boys, aged respectively 6, 7, 9, and 11 in the proportion of their ages.
- (2.) Divide £10,561, 17s. 3d. in the proportion of 8, 7, 4, and 2.
- (3.) Two merchants trade in company; A's stock is £400 and B's £270; they gain £33, 15s. Divide this fairly among them.
- (4.) Divide a bankrupt's assets, which amounted to £1000 net, among his 3 creditors A, B, and C. The claim of A amounting to £534; B, £622; and C, £764.
- (5.) Divide 1879 into 5 parts in the ratio of the following fractions:  
 $\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{1}{6}$ .
- (6.) Four merchants enter into partnership. Of the joint capital A contributed £888; B, £966; C, £800; D, £346. Their profits amounted to £2160. How much ought each to receive?
- (7.) Divide £4840 into 5 parts in the proportion of 1, 3, 5, 7, 9.
- (8.) Divide £4840 into 5 parts in the proportion of 2, 4, 6, 8, 10.
- (9.) A sum of £3660 was left to be divided among A, B, C, D, and E in the ratio of  $\frac{3}{8}, \frac{5}{8}, \frac{3}{4}, \frac{21}{4}$ , and  $\frac{1}{2}$ . Find the amount each obtained.
- (10.) Divide a thousand pounds in the proportion of 426, 341, and 263.
- (11.) A rating amounting to £2000 was required from villages with 2136, 2488, and 3056 inhabitants respectively. What sum had each village to pay?
- (12.) Divide £7540 in the proportion  $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}$ .

- (13.) A person left legacies as follows:—To A, £927; to B, £834; to C, £720; and to D, £219. At his death his estate only realized £2160 net. How should it be divided?
- (14.) Divide £1040 amongst A, B, C, D, and E, so that as often as A gets £1, 5s., B shall get 10s., C 15s., D £2, 6s. 8d., and E £5, 3s. 4d.
- (15.) Divide £1005, 12s. between A and B, so that A may have 5 times as much as B.
- (16.) A person left instructions for his property to be divided amongst his children in the following way:—For every crown that George was to receive Tom was to have a double florin, Harry a florin, Joe a shilling, and Mary 3 shillings. Find the share of each out of £2420.
- (17.) The four partners of a firm had put into the business £1500, £735, £115, and £150. Their profits amounted in 3 years to £2160. What did each receive per year?
- (18.) Divide the number 3120 into 5 parts, proportional to  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $2\frac{1}{2}$ ,  $5\frac{1}{2}$ .
- (19.) Divide £660 among A, B, and C, so that A shall have twice as much as B, and C as much as A and B together.
- (20.) A horse, saddle, and bridle together cost £38, 10s. The saddle cost six times as much as the bridle, and the horse cost ten times as much as the saddle and bridle together. Find the price of each?
- (21.) A, B, and C enter into partnership. A contributes £36 for 9 months; B, £62, 4s. for 10 months; C, £58, 13s. 4d. for 12 months. The profits amount to £2000. How should this sum be divided?
- (22.) A, B, and C rent a piece of pasture for £500. A puts on 80 sheep for 8 months; B, 110 sheep for 6 months; C, 40 sheep for 5 months. How much ought A, B, and C to pay respectively?
- (23.) Divide £144, 10s. among 3 persons in the proportion of 3, 33, and 3.
- (24.) A, B, and C agree to rent a meadow for £25, 12s. 5d. A puts in 15 sheep for 6 months; B, 45 sheep for 8 months; C, 81 sheep for 4 months. What should each pay towards the rent?
- (25.) Divide £35, 5s.  $1\frac{1}{2}$ d. among A, B, and C, so that B may get twice, and C three times as much as A.
- (26.) A prize of £2770 was divided among 3 persons in the proportion of the fractions  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{5}{6}$ . What were their respective shares of the prize?
- (27.) A purse and its contents are value for £30. The contents are nineteen times as valuable as the purse. How much money does the purse contain?
- (28.) A's age is double of B's, or three times C's, or 4 times D's. The sum of their ages is 100 years. Find the age of each.
- (29.) Divide £23,750 among A, B, and C, so that as often as A gets £4, B gets £3; and as often as B gets £6, C gets £5.

- (30.) In a certain substance there are 14 parts tin to 98 of copper. Find the weight of tin in a piece weighing 24 cwt.  
 (31.) Divide £500 among A, B, C, and D, so that B may receive as A, C as much as A and B together, and D as much as A, B, and C together.  
 (32.) The standard silver coin of this realm is made of 37 parts of pure silver and 3 of copper, and a lb. Troy of this metal yields 66 shillings. What weight of pure silver is there in 20 shillings?
- 

## PROFIT AND LOSS.

Profit and Loss are commercial terms used to express gain or loss in business transactions.

The gain or loss is always reckoned on the cost price. For example, if an article cost 2s. and was sold for 2s. 6d. the gain is 6d., not on the half-crown but on the 2s.—the cost price.

Example 1:—Bought 12 tons of hay at £3 per ton and sold it at 3s. 6d. per cwt., find the total gain.

$$\text{Cost price of 12 tons} = \text{£}12 \times 3 = \text{£}36.$$

$$\text{Selling price of 12 tons} = \text{£} \frac{12 \times 20 \times 7}{2 \times 20} = \text{£}42.$$

$$\therefore \text{Total gain} = \text{£}42 - \text{£}36 = \text{£}6.$$

Example 2:—Sold 50 yards of cloth at 15s. per yard, and gained thereby £7, 10s. Find the cost price per yard.

$$\text{Selling price of 50 yards} = \text{£} \frac{50 \times 15}{20} = \text{£} \frac{75}{2} = \text{£}37, 10s.$$

$$\therefore \text{£}37, 10s. - \text{£}7, 10s. = \text{£}30 = \text{cost of 50 yards.}$$

$$\therefore \text{cost price of 1 yard} = \text{£} \frac{30}{50} = \text{£} \frac{30 \times 20}{50} s. = 12s. \quad \text{Ans.} = 12s.$$

## Exercise 23.

- (1.) A man bought 50 yards of cloth at 3s. 6d. per yard, and sold it at 3s. 10d. per yard. Find his absolute gain.
- (2.) Find the total gain or loss incurred by a person who bought 30 tons of hay at £3, 10s. per ton, and sold it at 3s. per cwt.
- (3.) A merchant bought 230 cwts. of flour at 8s. 6d. per cwt., and sold it at 9s. 1½d. per cwt. Find his absolute gain.
- (4.) A man bought 3 tons of sago at £1, 15s. per cwt., and sold it at 4½d. per lb. Find his total gain or loss.
- (5.) A person bought 10 tons of potatoes at £3, 10s. per ton. At what price per stone must he sell them so as to gain £5 on the transaction?

## PROFIT AND LOSS.

- (a) Bought 100 gallons of sherry at 19s. 6d. per gallon, and sold it at a loss of £7, 10s. on the whole. Find the selling price per gallon.

(b) A draper bought a quantity of cloth at 12s. 6d. per yard, and by selling it at 15s. per yard he gained £40. How many yards did he buy?

(c) A trader bought a quantity of sugar at £2 per cwt., and by selling it at 6d. per lb. he gained £120 on the whole. What quantity did he buy?

(d) I sold 50 tons of hay at £3, 10s. per ton, and lost altogether £20 on the transaction. What was the prime cost of the hay per ton?

(e) A person bought a quantity of tea at 1s. 8d. per lb., and by retailing it at 1s. 11d. per lb. he gained £20 on the whole. How much did he buy?

A Profit or a Loss is not, as a rule, estimated *absolutely* but *relatively* to the *cost price*. For example, if an article is bought for £4 and sold for £5, and another is bought for £8 and sold for £9, the *absolute* gain in both cases is the same, but in *relation* to the *cost price* the gain in the first case is double that in the second.

In order to have a uniform method of expressing a gain or a loss relatively to the cost price, business men have adopted 100 as a standard cost price, and they express their gain or loss on a particular cost price by the corresponding gain or loss on 100.

It will therefore be convenient in the solution of examples to always take 100 as corresponding to the cost price.

Questions in Profit and Loss are worked by the principle of Proportion.

**Example 1:**—An article which cost £4 is sold for 4 guineas. Find the gain per cent.

Here £4—the cost price—corresponds to 100; find what 4 guineas will correspond to.

$$\text{As } £4 : £4\frac{1}{2} :: 100 : \frac{100 \times 21}{5 \times 4} = 105.$$

∴ when 100 is taken as cost price the selling price is 105, ∴ there is a gain of 5 per cent.

*Ans.* = 5 per cent gain.

**Example 2:**—Find the loss per cent in the case of an article which cost £10 and was sold for £8.

£10 corresponds to 100, what will £8 correspond to?

$$\text{As } £10 : £8 :: 100 : \frac{100 \times 8}{10} = 80.$$

$$\therefore \text{Loss per cent} = 100 - 80 = 20. \quad \text{Ans.} = 20\% \text{ loss.}$$

**Exercise 24.**

- (1.) A book which cost 3s. 4d. was sold for 4s. What was the gain per cent?
- (2.) What is the gain per cent in the case of an article which cost 4s. 6d. and was sold for 5s.?
- (3.) A cow which cost £12, 10s. was sold for £15. Find the gain per cent.
- (4.) I bought an article for 18s. 6d. and sold it for 21s. 7d. Find the gain per cent.
- (5.) A person sold an article for 4s. 6d. which he bought for 3s. 9d. Find the gain per cent.
- (6.) Find the gain per cent in the case of an article which cost £1, 4s. 6d. and was sold for 80s.
- (7.) Goods bought at £3, 10s. are sold for 4 guineas. Find the gain per cent.
- (8.) What is the gain per cent in the case of an article which was bought for 5s. and sold for 6s.?
- (9.) A watch was bought for £30 and sold for £34, 4s. Find the gain per cent.
- (10.) Cloth was bought at 14s. per yard and sold for 16s. 3d. a yard. Find the gain per cent.
- (11.) A piece of cloth cost 10s. 5d. and was sold for 9s. 7d. What was the loss per cent?
- (12.) An auctioneer gave £60 for goods which, when sold, only realized £55, 10s. Find his loss per cent.
- (13.) I sold for 7s. 6d. that which cost me 10s. What was the loss per cent?
- (14.) I sold a dog for 8s. 6d. which cost me 12s. What was the loss per cent?
- (15.) I bought goods for 7s. 3½d. and sold them at 9s. 4d. Find my gain per cent.
- (16.) Goods cost £46, 10s. 10d. and were sold at £44, 4s. 8½d. Find the loss per cent.
- (17.) A house was built for £1328 and sold for £1278, 4s. Find the loss per cent.
- (18.) Goods bought at £50 per ton and sold at 56s. per cwt. Find the gain or loss per cent.
- (19.) Bought 200 lbs. of tea for £13, 6s. 8d. and sold it at 1s. 10d. per lb. Find my gain or loss per cent.
- (20.) Bought iron at £21, 6s. 8d. a ton and sold it at 3d. per lb. Find my gain or loss per cent.

Example:—Find the selling price of an article which cost £20, and was sold at a profit of 5%.

Suppose the cost price to be 100, then its selling price is 105. The question is now easily resolved into one in Simple Proportion. 100 corresponds to the cost price £20, what amount of money corresponds to 105?

As 100 : 105 :: £20 : selling price.

$$\therefore \text{selling price} = \frac{21}{105} \times 20 = \text{£}21. \quad \text{Ans.} = \text{£}21.$$

*N.B.*—If in the last example the article had been sold at a loss of 5%, the question would have been to find what amount of money would correspond to 95.

### Exercise 25.

- (1.) Find the selling price of a book which cost 5s., and must be sold at a gain of 10%.
- (2.) An article cost £10, and the owner wishes to gain 4% on the cost price. Find the selling price.
- (3.) A person bought 1 ton of potatoes for £2, 5s. At what price per stone must he sell them to gain 20% on his outlay?
- (4.) A person bought a horse for £25. At what price must he sell him to gain 10% on his outlay?
- (5.) An article cost £30, and was sold at a loss of 30%; find the selling price.
- (6.) A person loses 10% on an article which cost him £8; find the selling price.
- (7.) Bought 30 tons of hay at £5 per ton; how must it be sold per cwt. so as to gain 10% on the outlay?
- (8.) An article cost 5s. and was sold at a gain of 25%; find the selling price.
- (9.) Find the selling price of an article which cost £8, 2s., and was sold at a loss of 11½%.
- (10.) A dealer bought tea at 2s. 6d. per lb.; how must he sell it per oz. so as to gain 33½ per cent?

Example:—Find the cost price of an article which was sold for £33 at a gain of 10%.

In this case, if 100 correspond to the cost price, 110 will correspond to the selling price—£33. The question is to find what amount of money will correspond to 100.

As 110 : 100 :: £33 : cost price.

$$\therefore \text{Cost price} = \frac{100 \times 33}{110} = \text{£}30. \quad \text{Ans.} \text{ £}30.$$

*N.B.*—In the last example, if the article had been sold at a loss of 10%, 90 would have corresponded to the selling price—£33.

### Exercise 26.

- (1.) I lost 12½% by selling an article for £3, 10s.; what did it cost me?
- (2.) By selling an article at 3s. I lost 10%; what was the prime cost?

- (3.) By selling a house for £451, 10s. I gained  $7\frac{1}{2}\%$  on my outlay; find the cost price.
- (4.) I gained 20% by selling a horse for £45; what did he cost me?
- (5.) I sold a machine for £95 at a loss of 5%; find its prime cost.
- (6.) By selling potatoes at 6d. per stone I clear 50% on my outlay; what did the potatoes cost me per ton?
- (7.) I sold goods at 24 guineas at a profit of  $22\frac{1}{4}\%$  per cent; find the prime cost of them.
- (8.) By selling a horse for £49, 4s. a person loses 18 per cent; find his original cost.
- (9.) Find the original cost price of an article which was sold for £30 at a loss of 50%.
- (10.) By selling hay at 5s. per cwt. I gain 10 per cent on my outlay; what did the hay cost me per ton?

Example:—By selling an article at £17, 5s. there is a loss of 8%; what will be the gain or loss per cent by selling it at £19?

The standard cost price being 100; the selling price in the first case—£17, 5s. must correspond to 92, required the number to which £19 will correspond.

$$\text{As } 17\frac{1}{4} : 19 :: 92 : \frac{492 \times 19 \times 4}{693} = \frac{304}{3} = 101\frac{1}{3}$$

∴ the gain % =  $1\frac{1}{3}\%$ .

Example:—By selling a watch for £9, 5s. a person loses  $7\frac{1}{2}\%$ ; what should he have sold it at to gain  $6\frac{1}{4}\%$ ?

In this case £9, 5s. corresponds to  $92\frac{1}{2}$ ; what amount would correspond to  $106\frac{1}{4}$ ?

$$\text{As } 92\frac{1}{2} : 106\frac{1}{4} :: 9\frac{1}{2} : \text{Ans.}$$

85

$$\therefore \text{selling price required} = \frac{\frac{492}{4} \times \frac{87}{4} \times \frac{1}{2}}{\frac{4}{2} \times \frac{4}{3} \times \frac{85}{3}} = \frac{85}{8}$$

$$= £10, 12s. 6d.$$

Ans. £10, 12s. 6d.

## MISCELLANEOUS EXAMPLES.

### Exercise 27.

- (1.) Having purchased a house for £350, what must I sell it for to gain 8 per cent?
- (2.) I bought hats at 4s. 6d. each; at what price must I sell them to gain 10 per cent?
- (3.) I lose 20% by selling a horse for £80; what did it cost?
- (4.) What was the prime cost of an article which when sold for 12s. realized a profit of 20%?
- (5.) I sold some property, which cost me £250, 10s., at a profit of 15 per cent; what did I receive for it?

- (6.) I bought a horse for £25; at what price must I sell him to gain 23 per cent?
- (7.) I sold an article for 17s. 6d. at a loss of  $12\frac{1}{2}\%$ ; find the prime cost.
- (8.) If 15% is lost by selling goods at £70, what did they cost at first?
- (9.) What was the prime cost of a house which when sold for £350 realized a profit of 15%?
- (10.) I gained  $3\frac{3}{4}\%$  per cent on goods which cost me 6s. 3d.; find the selling price.
- (11.) I lost  $12\frac{1}{2}\%$  on an article which cost me 11s. 8d.; at what price did I sell it?
- (12.) Sold  $\frac{5}{8}$  of a piece of land for what the whole cost; what was the gain per cent?
- (13.) An ironmonger bought nails at 16s. 8d. per cwt. and sold them at  $2\frac{1}{2}d.$  per lb.; what did he gain or lose per cent?
- (14.) I gained  $12\frac{1}{2}\%$  on an article which cost me 7s. 6d.; what did I sell it for?
- (15.) I lost  $12\frac{1}{2}\%$  on goods which cost me £2, 10s.; what did I sell them for?
- (16.) By selling an acre of land for 30 guineas I gained  $\frac{5}{8}$  of what it cost me; find the cost price.
- (17.) A draper sells 104 yds. of lace for £138 $\frac{3}{4}$ , and thereby loses 10%; at what price per yard should he have sold it to gain 8%?
- (18.) An article was sold for 3s. 4d., and there was a gain of  $6\frac{1}{4}\%$ ; what was the cost price?
- (19.) I lost 10% by selling an article which cost me 5s. 10d.; find the selling price.
- (20.) By selling an article at £26, 17s. 6d. I gained 25%; what would my gain % have been had I sold it at £28, 13s. 4d.?
- (21.) By selling goods at £12, 12s. per cwt. a person gained  $12\frac{1}{2}\%$ ; find the cost price per lb.
- (22.) I buy 4 tons 7 cwts. 2 qrs. of sugar for £240, and pay £5 for expenses. I then sell the sugar at 4 guineas per cwt. Find my gain per cent.
- (23.) By selling goods at 3 guineas I lost 12s.; what was that per ct.?
- (24.) A boy lost 24 out of 90 walnuts; find his loss %.
- (25.) A grocer bought rice at £1, 3s. 4d. per cwt. and retailed it at 3d. per lb.; what did he gain or lose per cent?
- (26.) I bought an oak cabinet for £7, 10s. and sold it at a profit of of  $13\frac{1}{2}\%$  per cent; what profit did I reap?
- (27.) I gave £75 for a horse and trap; for what must I sell it to gain 9%?
- (28.) A bankrupt owes £7500 and only pays 8s. in the pound; find the percentage of loss his creditors sustained.
- (29.) A merchant sold 8 yards of ribbon at  $3\frac{1}{2}d.$  per yard, thereby gaining 40%; what did the ribbon cost him?
- (30.) What is a gain of  $27\frac{1}{2}\%$  on £72?
- (31.) A draper sold goods for £122, 10s. which cost him £105; find his gain per cent.

- (22.) If 20% profit is made by selling mackerel at 3d. each, what would 300 cost the dealer?
- (23.) A melodeon which cost 15s. was sold for £1; find the gain per cent.
- (24.) A tradesman allows a discount of 9d. in the £1; what is that per cent?
- (25.) A draper paid 18s. for 16 pairs of gloves, which he retailed at 1s. 3d. per pair; find his gain or loss %.
- (26.) A cattle-dealer bought a cow for £12; what price would he get for it if he sold it at a gain of 15%?
- (27.) I bought 2 horses for £40, and kept them for 6 weeks at a cost of £10. For what price ought I to sell the pair to gain 5% on my outlay?
- (28.) A person gained one guinea by selling a watch at a gain of 4½%; find the cost price.
- (29.) A boy had 240 marbles. He lost 6½ per cent at play and sold the remainder at 16 for a ½d. How much money did he receive?
- (30.) A grocer bought half-a-hundredweight of sugar at 3d. per lb. and sold it for a guinea. Find his gain or loss %.
- (31.) The buying price of an article was pounds sterling, and the selling price was the same number of guineas. Find the gain %.
- (32.) A bankrupt owed £150 and could only pay £67, 10s. What did his creditors lose per cent?
- (33.) If 5% is lost by selling butter at 9½d. per lb., how much per lb. should it be sold at to gain 10%?
- (34.) An article, if sold for 2s. 11d., would produce a profit of 5%, what per cent would be gained or lost by selling it at 2s. 3d.?
- (35.) If 10% is lost by selling a piano for £27, for what price should it be sold to gain 10%?
- (36.) Instead of selling an article for £32, 10s. and thereby gaining 4%, a certain tradesman miscalculated the price and sold it at a loss of 4%. What did he sell it for?
- (37.) A harmonium which cost 18 guineas was sold for 15 guineas. Find the loss per cent?
- (38.) By selling a pair of blankets for 23s. 15 per cent would have been gained; but they were sold at a loss of 15%. What price did they realize?
- (39.) A boy bought a knife for 3s. 1d., and this was 7½% less than the usual price. He sold it for 7½% more than the usual price. How much did he get for it?
- (40.) By selling an article for £4 I gained  $\frac{1}{3}$  of my outlay; what would my gain per cent have been had I sold the article for £2, 16s.?
- (41.) How many eggs, bought at the rate of 10 for 4d., must be sold for one shilling to gain 50%?
- (42.) Find the gain or loss per cent in the case of eggs, bought at the rate of 8 for 6d. and sold at 10d. per doz.
- (43.) How many needles, bought at 2s. a gross, must I sell for 1d. in order to gain 20%?

- (54.) A dealer buys eggs at the rate of 6 for 2d. How must he sell them per doz. to gain 50%?
- (55.) Bought pins 18 in a row and sold them at the same price with only 12 in a row. Find the gain per cent.
- (56.) By selling an article for 12s. 6d. I lose 15%; find the selling price at which there would be neither gain nor loss.
- (57.) By selling sugar at  $2\frac{1}{2}$ d. per lb. a grocer gains  $33\frac{1}{3}\%$ . What did the sugar cost him per cwt.?
- (58.) A stationer sold nibs at 5s. 6d. per 1000, clearing  $\frac{2}{5}$  of his outlay; find his gain per cent by selling them at 6s. 9d. per 1000.
- (59.) By selling cloth at 9s. per yard there is a gain of 5%; how much per cent will be gained by selling the same cloth at 11s. 3d. per yd.?
- (60.) A person bought 1836 yards of cloth at 3s. 2d. per yd. He sells  $\frac{1}{3}$  of it at 3s. 6d. per yd., and half of the remainder at 3s. 11d. per yd. At what price per yd. must he sell the rest to gain  $12\frac{1}{2}$  per cent on the whole?
- 

## COMPOUND INTEREST.

When the interest due at the end of each stated period of time is added to the principal, the result forming a new principal for the ensuing period, it is called COMPOUND INTEREST.

Suppose £100 is put out at compound interest for 3 years at 5%. At the end of the 1st year £5 interest is due. This is added on to the £100, and the interest for the second year is calculated upon £105. The interest on £105 for the next year at 5% = £5, 5s., and consequently the new principal for the succeeding year is £110, 5s. The interest on this for the 3rd year is £5, 10s. 3d., making a total of £115, 15s. 3d. at the end of the three years. The compound interest, therefore, on £100 for 3 years at 5% = £15, 15s. 3d., whereas the simple interest for the same time at the same rate would only have been £15.

To find the amount at compound interest of any sum for a given time at a given rate:—

Rule:—1st. Find the amount of £1 for 1 period at the given rate.

2d. Raise this amount to the power indicated by the number of periods.

3d. Multiply this result by the given sum for the required amount.

The compound interest is found by subtracting the principal from the amount.

Example 1:—Find the compound interest on £500 for 4 years at 4%.

$$\begin{aligned}
 & \text{Amt. of £1 for 1 yr. at } 4\% = 1.04. \\
 \therefore & \quad " \quad \text{£1} \quad " \quad 4 \text{ yrs.} \quad " \quad = (1.04)^4. \\
 \therefore & \quad " \quad \text{£500} \quad " \quad 4 \text{ yrs.} \quad " \quad = (1.04)^4 \times 500 = \text{£584.92948} \\
 & \qquad \qquad \qquad \qquad \qquad = \text{£584}, 18s. 7\frac{1}{2}d.
 \end{aligned}$$

$\therefore$  Compound interest = £84, 18s. 7 $\frac{1}{2}$ d. = Ans.

### Exercise 28.

Find (a) the amount of, and (b) the interest on—

(1.) £3245 in 3 years at 6% per annum compound interest.

(2.) £4390     "     6%     "     "     "

(3.) £670     "     4%     "     "     "

(4.) £5678     "     7%     "     "     "

(5.) £8765     "     6%     "     "     "

(6.) £7205     "     6%     "     "     "

(7.) £1390     "     4%     "     "     "

(8.) £4520     "     8%     "     "     "

(9.) £3670     "     6%     "     "     "

(10.) £3750     "     6%     "     "     "

(11.) £8270     "     4%     "     "     "

(12.) £4950     "     8%     "     "     "

(13.) £4250     "     5%     "     "     "

(14.) £3450     "     5%     "     "     "

(15.) £2100     "     5%     "     "     "

(16.) £4750     "     5%     "     "     "

(17.) £265     "     5%     "     "     "

(18.) £1500     "     5%     "     "     "

(19.) Find the compound interest on £5920 in 3 yrs. at 2% per annum.

(20.) Find what sum £2830 will amount to in 3 years at 4 $\frac{1}{2}\%$  compound interest.

(21.) The sum of £3680 was invested for 3 years at 4% compound interest. What was the excess of the amount then drawn over the original principal?

(22.) The sum of £1875 was lent out at 4 $\frac{1}{2}\%$  per annum compound interest. Find the amount of the accumulated interest at the end of the 3rd year.

(23.) Find the amount of £8150 in 3 years at 2 $\frac{1}{2}\%$  per annum compound interest.

(24.) Find the amount of interest which will accumulate upon £1785 in 3 years at 10% per annum compound interest.

(25.) To what amount will £700 increase in 3 yrs. if invested at 4 $\frac{1}{2}\%$  compound interest?

(26.) £4175 was lent out at 2 $\frac{1}{2}\%$  per annum compound interest. To what amount would it rise in 3 years?

(27.) Find the interest on, and the amount of £3000 lent for 3 years at 3 $\frac{1}{2}\%$  per annum compound interest.

- (28.) Find compound interest on £8700 for 3 years at  $4\frac{1}{2}\%$ .  
 (29.) Find the amount at compound interest of £3200 in 3 yrs. at  $4\frac{1}{2}\%$ .  
 (30.) Find the compound interest on £19,050 for 3 years at  $4\frac{1}{2}\%$ .

Example 2:—Find the compound interest on £200 for 1 year at 4%, the interest accruing quarterly.

The number of periods = 4.

$$\text{The amount of £1 for 1 qr. year at } 4\% = 1.01.$$

$$\therefore \quad \begin{matrix} \text{£1} \\ " \end{matrix} \quad \begin{matrix} \text{£1} \\ " \end{matrix} \quad \begin{matrix} 4 \\ " \end{matrix} \quad \begin{matrix} " \\ " \end{matrix} \quad = (1.01)^4.$$

$$\therefore \quad \begin{matrix} \text{£200} \\ " \end{matrix} \quad \begin{matrix} \text{£200} \\ " \end{matrix} \quad \begin{matrix} 4 \\ " \end{matrix} \quad \begin{matrix} " \\ " \end{matrix} \quad = (1.01)^4 \times 200.$$

$$(1.01)^4 \times 200 = £208, 2s. 4.99248d.,$$

$$\therefore \text{compound interest} = £8, 2s. 4.99248d. \quad Ans.$$

To find the amount at compound interest of a given sum for a number of periods and a fraction of a period at a given rate.

1st. Find the amount of the given sum for the number of periods, neglecting the fraction.

2d. Find the amount of this result for the fraction of a period at the given rate.

Example 3:—Find the amount of £300 for  $2\frac{1}{2}$  years at 5% compound interest.

$$\text{Amount of £1 for 1 year at } 5\% = 1.05.$$

$$\therefore \quad \begin{matrix} \text{£1} \\ " \end{matrix} \quad \begin{matrix} \text{£1} \\ " \end{matrix} \quad \begin{matrix} 2 \text{ yrs.} \\ " \end{matrix} \quad \begin{matrix} " \\ " \end{matrix} \quad = (1.05)^2.$$

$$\therefore \quad \begin{matrix} \text{£300} \\ " \end{matrix} \quad \begin{matrix} \text{£300} \\ " \end{matrix} \quad \begin{matrix} 2 \text{ yrs.} \\ " \end{matrix} \quad \begin{matrix} " \\ " \end{matrix} \quad = (1.05)^2 \times 300.$$

$$(1.05)^2 \times 300 = £330.75.$$

Now the interest on £330.75 for  $\frac{1}{2}$  year at 5%

$$= \frac{330.75 \times \frac{1}{2} \times 5}{100} = £8.26875,$$

$$\therefore \text{Amt.} = £330.75 + £8.26875 = £339.01875 = £339, 0s. 4\frac{1}{2}d. \quad Ans.$$

To find what principal would amount to a given sum, in a given time, at a given rate, compound interest.

Rule:—Divide the given amount by the amount of £1 for the given time at the given rate.

Example 4:—Find what principal would amount to £1242, 5s.  $11\frac{1}{2}d.$  in 3 years at  $7\frac{1}{2}\%$ .

$$\text{Amount of £1 for 3 years at } 7\frac{1}{2}\% = (1.075)^3.$$

$$\therefore \text{Ans.} = \frac{1242.296875}{(1.075)^3} = £1000.$$

The following is the general formula for the solution of questions in compound interest: where  $a$ =the amount of £1 for one period at the given rate,  $n$ =the number of periods,  $P$ =the principal, and  $A$ =the amount.

$$A = P \times a^n,$$

and dividing both sides of the equation by  $a^n$ ,

$$P = \frac{A}{a^n}$$

The rate and time can also be found by the equation

$$A^n = \frac{A}{P}$$

### Exercise 29.

- (1.) What is the compound interest on £400 for 1 year 6 months at 7%, the interest being reckoned half-yearly?
- (2.) Find the compound interest on £2000 for 1 year at 8%, the interest being paid quarterly.
- (3.) To what sum will £480 amount in 3 years at 5% per annum compound interest?
- (4.) Find the difference between the simple and compound interest on £360 for 3 years at 5%.
- (5.) A invests £457, 10s. at compound interest for 3 years at 4%. B invests £477, 10s. for the same time at the same rate simple interest. How much interest does the one receive more than the other?
- (6.) Find the compound interest and amount of £690 for 2 years at 4½%.
- (7.) What is the compound interest on £1085 for 3 years at 3½%?
- (8.) Find the difference between the simple and compound interest on £150 for 3 years at 4½%.
- (9.) What sum would a capital of £6350 amount to in 3 years at 4½% per annum compound interest?
- (10.) Find what sum a principal of £4725 will amount to in 3 years at 3½% per annum compound interest.
- (11.) What sum would £8323 amount to in 3 years at 4½% per annum compound interest?
- (12.) Find what amount a person could withdraw at the end of 3 yrs. who invested £2685 at 3½% compound interest, the interest being payable yearly.
- (13.) £4750 was lent out at 3½% per annum compound interest. What would be the principal at the beginning of the 4th year?
- (14.) Find the amount of £21,030 in 3 yrs. at 3½% compound interest.
- (15.) A person put £500 in a bank which paid 2½% per annum. The interest was added to the principal at the end of each year for 3 years. Find the total interest added.
- (16.) Find the compound interest on £4175 for 3 years at 3½%.
- (17.) Find the amount at comp. interest of £3650 in 3 years at 2½%.
- (18.) Find the compound interest and amount of £4765 for 2 years at 3½%.

- (19.) The sum of 3542 guineas 18s. was invested at  $3\frac{1}{4}\%$  per annum compound interest. Find the amount at the end of the 3rd year.
- (20.) Two sums, of £574, 17s. and 3643 guineas respectively, were invested at  $3\frac{1}{4}\%$  compound interest for 3 years. Find the total amount of interest the two sums would produce.
- (21.) £5860 was producing 4% per annum compound interest for 3 years. What was its amount at the end of that time?
- (22.) What would be the amount of £6230 in 3 years at 4%?
- (23.) To what sum will £1822, 18s. 4d. accumulate in 3 years at 4% compound interest?
- (24.) What sum would £3575 amount to in 18 months at 8% compound interest, the interest to be added half-yearly?
- (25.) Find the amount of £5920 in  $1\frac{1}{2}$  years at 4% per annum compound interest, interest payable half-yearly.
- (26.) £132, 16s. 8d. and 510 guineas were invested in different securities, both of which paid interest half-yearly at the rate of 22% per annum compound interest. Find the total interest added in  $2\frac{1}{2}$  years.
- (27.) Compare the simple and compound interest on £10, 8s. at the end of 3 years, reckoning money at 4%.
- (28.) What will a debt of £4250 amount to if left standing for  $2\frac{1}{2}$  years at 5% compound interest?
- (29.) Find the compound interest on £104 for 1 year 9 months at 5%.
- (30.) Find the compound interest and amount of £4800 for 2 years at 4%.
- (31.) Find the compound interest on £265 for 3 years at 5%.
- (32.) Find the compound interest on £500 for 4 years at 5%.
- (33.) Find the compound interest on £270 in 2 years at 3%.
- (34.) Find difference between simple and compound interest on £3300 for 2 years at  $3\frac{1}{4}\%$ .
- (35.) What is the difference between the simple and compound interest on £150 in 3 years at  $4\frac{1}{2}\%$ ?
- (36.) What sum of money will amount to £413, 8s. 9d. in 2 years at 5% compound interest?
- (37.) What principal would amount to £4802, 15s. 3 $\frac{3}{4}$ d. in  $2\frac{1}{2}$  years at 5% compound interest?
- (38.) What principal would amount to £2484, 11s. 10 $\frac{1}{2}$ d. in 3 years at  $7\frac{1}{2}\%$  compound interest?
- (39.) What sum of money will amount to £1050, 12s. 6d. in 2 years at  $2\frac{1}{2}\%$  compound interest?
- (40.) What principal will amount to £1736, 8s. 9d. in 3 years at 5% compound interest?
-

## STOCKS.

STOCK is the term applied to the capital of a Company, or to the money lent to our own or some foreign Government.

Government Stocks are sometimes called the Funds.

Suppose a government is in want of money, and it proposes to give 4 per cent per annum for the money it borrows. If A should lend £100 to this government he will receive a perpetual annuity of £4 from the public revenues. If A wanted his principal at any time he could not demand it from the government, but he can take his receipt into the share-market and dispose of it for cash, transferring the ownership of the loan with the consequent interest to the buyer. If money is very plentiful, and other investments only pay about 2 per cent per annum, A will get considerably more than £100 cash for his £100 stock. On the other hand, if money is scarce, and other investments yield 5 per cent per annum, A would get considerably less than £100 cash for his £100 stock. It is therefore very necessary for the student to get a clear notion of the difference between *money in the funds or stock and ready cash*.

A person is said to *invest* in the stocks when he takes an amount of *cash* and buys *stock* at the current market price.

Stock is generally bought and sold at so much per £100. When £100 stock is value for £100 cash it is said to be at *par*; when it is value for less than £100 cash it is said to be at a *discount*; and when it is value for more than £100 cash it is said to be at a *premium*. For example, when £100 stock sells for £98 cash it is said to be at 2 per cent discount, and when it sells for £104 it is said to be at 4 per cent premium.

All questions in Stocks are solved by Simple Proportion.

To enable the student to distinguish more readily the difference between *Pounds Stock* and *Pounds Cash* we may notice (i) that money which is to be *invested* is *cash*, and (ii) that money which is to be *bought* or *sold out* is *stock*.

The "Consols" is a short expression for the British Government Consolidated Loans, which pay £2 $\frac{1}{2}$  per £100 stock.

Example 1:—How much stock at 90 could be bought for £720?

In other words, if £90 cash will buy £100 stock, how much stock can be bought for £720?

$$\begin{array}{r} \text{Cash.} \quad \text{Cash.} \quad \text{Stock.} \\ \text{As } \text{£90} : \text{£720} :: \text{£100} : \text{Ans.} \end{array}$$

$$\therefore \text{Amount of stock} = \frac{720 \times 100}{90} = \text{£800}. \quad \text{Ans.} = \text{£800 stock.}$$

## Exercise 30.

- (1.) How much stock at 90 could be bought for £903, 12s.?
- (2.) What quantity of stock at 92 could be bought for £3739, 16s.?
- (3.) What amount of stock can be purchased for £3048 at 100?
- (4.) How much stock at 110 can be purchased for £4004?
- (5.) When the value of £100 stock is £116 cash what quantity of stock can be bought for £3532, 4s.?
- (6.) When the Consols are at 96 what quantity can be purchased for £1224?
- (7.) How much stock can be purchased for £5414, 5s. 9d. at 85½?
- (8.) The Consols are at 92½. What quantity of stock can be bought for £5857, 11s. 3d.?
- (9.) What quantity of stock can be purchased for £6095, 0s. 7½d. at 96½?
- (10.) A man has £6601, 12s. 7½d. of ready cash. How much stock can he buy at 104½?

Example 2:—How much cash would be realized by the sale of £2360 stock at 98½?

When written as a question in Proportion it becomes—

If £100 stock would realize £98½ cash, how much cash would £2360 stock realize?

$$\begin{array}{lll} \text{Stock.} & \text{Stock.} & \text{Cash.} \\ \text{As } \frac{\text{£100}}{\text{£2360}} : \frac{\text{£98}\frac{1}{2}}{\text{£}} & : : \text{Ans.} \\ \text{Amount of cash} = \frac{2360 \times 197}{2 \times 100} & = \text{£2324, 12s.} \end{array}$$

*Ans.* £2324, 12s. cash.

Example 3:—How much cash would be required to purchase £2046, 16s. 8d. stock at £72½?

That is, £72½ cash will purchase £100 stock; how much cash will purchase £2046, 16s. 8d. stock?

$$\begin{array}{lll} \text{Stock.} & \text{Stock.} & \text{Cash.} \\ \text{As } \frac{\text{£100}}{\text{£2046}\frac{2}{5}} : : \frac{\text{£72}\frac{1}{2}}{\text{£}} & : : \text{Ans.} \\ \text{Amount of cash} = \frac{2046\frac{2}{5} \times 72\frac{1}{2}}{100} & = \text{£1483, 19s. 1d.} \end{array}$$

*Ans.* £1483, 19s. 1d. cash.

## Exercise 31.

- (1.) Find the cost of £1004 stock at (a) 90, (b) 95, (c) 105, (d) 120.
- (2.) Find the cash value of £4065 stock at (a) 92, (b) 116, (c) 108, (d) 103½.
- (3.) Find the price of £3048 Consols when they are at (a) 96, (b) 120, (c) 100.
- (4.) Find the value of £3640 Consols when they are at (a) 95, (b) 110, (c) par.

- (5.) What would an investor pay for £3045 Russian Four per cents when they are at (a) 116, and again at 6 per cent discount?
- (6.) Eight persons invested at different times in the Three per cents. A paid 96; B, 95; C, 98; D, 93; E, 105; F, 124; G, 85; H, 72. Find the amount paid for £1275 stock purchased by each.
- (7.) Find the sum paid for £3044 stock at 102.
- (8.) What would an investor pay for £2076 stock at 96?
- (9.) What would £6332, 10s. New Two-and-a-half per cent Consols realize when the selling price was 85½?
- (10.) What would £6332, 10s. Consols realize at 92½?
- (11.) What would £6332, 10s. Four per cents realize at 96¼?
- (12.) What would a person receive who sold £6332, 10s. Five per cents when they stood at 104½?
- (13.) A person left £6332, 10s. Railway stock to be sold and the proceeds divided amongst his heirs. At his death it was sold out when the price stood at 123½. What amount of cash was realized?
- (14.) What would a person receive for £6332, 10s. Consols who sold them to a capitalist at 98¾?
- (15.) A buys at 104½, B at 93¾, and C at 80. Find what amount each pays for £8653, 6s. 8d. stock.
- (16.) X sells out at 91½, Y at 83¾, Z at 97½, and W at 108¾. What does each receive for £1045 stock?
- (17.) How much stock can be purchased for £118, 13s. 5d. at 95?
- (18.) How much money is obtained from the sale of £678 at 95?
- (19.) How much stock must be sold to realize £609, 13s. 9d. at 62½?
- (20.) How much money must be given for the purchase of £3012, 5s. stock at 103¾?

If a 2½ per cent stock is quoted at 92, it means that £100 stock can be purchased for £92 cash, and that a person who invests £92 in this stock will receive £2, 15s. a year as interest.

Example 4:—What income per annum would be derived from £1300 invested in the Three per cents at 75?

Every £75 invested brings an income of £3 a year, what income would be derived from £1300?

|                |              |         |
|----------------|--------------|---------|
| Cash.          | Cash.        | Income. |
| As £75 : £1300 | :: £3 : Ans. |         |

$$\text{Income} = \frac{\text{£}1300 \times \frac{3}{75}}{25} = \text{£}52.$$

*Ans.* £52 per annum.

Example 5:—A person has £1530 Two-and-a-half per cent stock at 72. Find his yearly income.

In this case £1530 is stock already purchased at 72, and every £100 of this stock entitles him to an income of £2, 10s. per year. The question is, what income does he derive from the whole £1530 stock?

$$\begin{array}{lll} \text{Stock.} & \text{Stock.} & \text{Income.} \\ \text{As } \text{£100} : \text{£1530} :: \text{£2}\frac{1}{2} : \text{Ans.} \\ \text{Income} = \frac{1530 \times \frac{5}{2}}{2 \times 100} = \text{£38}, 5s. \\ \quad \quad \quad \frac{1530}{2} \\ \quad \quad \quad 100 \\ \quad \quad \quad 5 \end{array}$$

*Ans.* £38, 5s. income per annum.

### Exercise 32.

What income would be derived from each of the following sums:—

- (1.) £3750 invested in the 5% at 90?
- (2.) £5730 invested in the 3% at 93 $\frac{1}{2}$ ?
- (3.) £500 invested in the 2 $\frac{1}{2}$ % at 84 $\frac{3}{4}$ ?
- (4.) £1890 invested in the 4 per cents at 88?
- (5.) £4050 invested in the New 2 $\frac{1}{2}$ % at 118 $\frac{1}{2}$ ?
- (6.) £1872 invested in the Russian 4 per cents at 90?
- (7.) What income will be derived from £3600 invested in the 4 per cents when they are at 84 $\frac{3}{4}$ ?
- (8.) The sum of £5700 is invested in the Four-and-three-quarter per cents at 114. What annual income does the investor receive?
- (9.) Find the income which would be derived from investing £9000 in the New Three per cents at 75?
- (10.) £2340 is invested in the 3 $\frac{3}{4}$  per cents at 112 $\frac{1}{2}$ ; find the annual income derived.
- (11.) A gentleman invested £1500 in the New 2 $\frac{1}{2}$  per cents when they stood at 84 $\frac{3}{4}$ . What yearly income would the investment produce?

Find the annual incomes derived from the following stocks:—

- (12.) £4830 of Russian Five per cents.
- (13.) £2680 of the New Two-and-a-half per cents.
- (14.) £8340 of Railway stock (4%).
- (15.) £5275 of ordinary Three per cents.
- (16.) £2636, 10s. of Indian 7 $\frac{1}{2}$  per cents.
- (17.) What income is derived from £3000 Four-and-a-half per cent stock at 120?
- (18.) Find the gentleman's income who possesses £8500 stock in the 4 $\frac{1}{2}$  per cents at 125.
- (19.) Find the income derived from £9375 of 3 per cent stock.
- (20.) When the 2 $\frac{1}{2}$  per cents are at 98, what income does a person receive who possesses £2846, 10s. of it?

- (21.) A person possessed £3269, 10s. stock in the Bank of England (10%) when the price stood at 250. Find his income.  
 (22.) What income is derived from £5700 of 5% stock?  
 (23.) Find the half-yearly income to be derived from investing the sum of £7320 in the Five per cents at 91 $\frac{1}{2}$ .  
 (24.) Find the weekly income derived from £1787, 10s. invested in the 3 per cents at 103 $\frac{1}{2}$ .

Example 6:—How much must be invested in a 4 per cent stock at 110 to obtain an income of £150 per year?

Here an investment of £110 will bring an income of £4. How much must be invested to bring an income of £150?

$$\text{As } £4 : 150 :: 110 : \text{Ans.}$$

$$\therefore \text{Amount} = \frac{110 \times 150}{4} = £4125.$$

*Ans.* £4125.

Example 7:—A man invests in a 3 per cent stock at 90; what percentage does he get on his money? The question is to find what income he will derive from an investment of £100, when we are given that an investment of £90 will produce an income of £3.

$$\therefore \text{As } £90 : £100 :: 3 : \text{Ans.}$$

$$\therefore \text{per centage required} = \frac{1(0 \cdot 3)}{90} = 3\frac{1}{3}\%. \quad \text{Ans. } 3\frac{1}{3}\%.$$

Example 8:—Which is the better investment, the 3 per cents at 92 or the 4 $\frac{1}{2}$  per cents at 130?

An investment of 92 in the 3 per cents produces an income of £3 a year, it is required to find how much it will produce in the 4 $\frac{1}{2}$  per cents.

$$\text{As } £130 : £92 :: £4\frac{1}{2}.$$

$$\therefore 92 \text{ in the } 4\frac{1}{2} \text{ per cents produces } £\frac{92 \times 4\frac{1}{2}}{130} = £3\frac{1}{2}\text{.}$$

∴ the 4 $\frac{1}{2}\%$  at 130 is the better investment.

Example 9:—At what price must a man invest in the 4 per cents to obtain 5 per cent for his money?

£5 is to be the income derived from an investment of £100; required to find how much must be invested to produce an income of £4.

$$\text{As } £5 : £4 :: £100 : \text{Ans.}$$

$$\frac{20}{4 \times 100} = \frac{5}{5} = £80. \quad \text{Ans.} = £80.$$

## Exercise 33.

- How much must be invested in the 5 per cents at 90 to obtain an income of £208, 6s. 8d. per annum?
- Find the amount of money a man must invest in the Russian 4 per cents at 90 to secure an income of £83, 4s. per year.
- What amount of money must be invested in the 4 per cents at  $8\frac{1}{2}$  to secure an income of £170, 13s. 4d. per annum?
- What sum must be invested in the  $4\frac{3}{4}$  per cents at 114 to produce an income of £237, 10s. per annum?
- How much must be invested in the New Three per cents at 75 to produce an income of £360 a year?
- A man invests in the 3 per cents at (a)  $96\frac{7}{8}$ , (b)  $87\frac{1}{2}$ , (c)  $88\frac{3}{4}$ , (d) 100. What rate per cent does he get for his money in each case?
- Find the rate of interest per cent actually obtained in the  $4\frac{1}{2}$  per cents at (a)  $102\frac{3}{8}$ , (b)  $103\frac{1}{8}$ , (c) 65.
- What rate of interest does a person get on his money who invests in the 5 per cents at (a) 99, (b)  $111\frac{3}{8}$ , (c)  $122\frac{3}{8}$ ?
- Find the rate of interest obtained in the Indian Four per cents at (a)  $93\frac{3}{4}$ , (b)  $78\frac{1}{2}$ , (c)  $82\frac{1}{2}$ .
- Find the rate of interest obtained by an investor in  $7\frac{1}{2}\%$  bank stock at (a)  $84\frac{3}{8}$ , (b)  $101\frac{1}{4}$ , (c)  $67\frac{1}{2}$ .
- What percentage is obtained on money invested in the New  $2\frac{1}{2}$  per cents when they stand at (a)  $94\frac{1}{2}$ , (b) 90, (c)  $61\frac{1}{2}$ ?
- What is the rate per cent obtained on money invested in the 5 per cents at (a) 240, (b)  $100\frac{1}{2}$ ?
- Which is the better investment, the 4 per cents at 104 or the 5 per cents at 127?
- Which of the following stocks is the most advantageous to invest in: the  $3\frac{3}{4}\%$  at 90, or the  $4\frac{1}{2}$  per cents at 125?
- A man invests £4500 in each of the following stocks: the  $3\frac{1}{4}$  per cents at 90, and the 5 per cents at 125. How much more interest does he get in the one than the other?
- Which is the better investment, bank stock paying 10 per cent at 310 or the 3 per cents at 92?
- Which is the better investment, the  $2\frac{1}{2}\%$  at 75 or the 4 per cent at par?
- Which is the better investment, the 3 per cents at 5 per cent discount, or the  $4\frac{1}{2}$  per cents at  $12\frac{1}{2}$  per cent premium?
- At what price must a man invest in the 5 per cents to obtain (a) 6%, (b) 3%, (c)  $2\frac{1}{2}\%$  on his money?
- By investing in the  $2\frac{1}{2}\%$  consols a man gets (a) 3%, (b) 2%, (c) 4% on his money; at what price respectively did he buy?
- By investing in the  $3\frac{1}{4}$  per cents a person gets  $3\frac{1}{4}\%$  on his money; at what price did he buy?
- Find the price of the New Two per cents when interest is obtained upon the investment (a) 4%, (b) 3%, (c) 5%.

- (28.) Find the price of the Four per cents to yield (a)  $2\frac{1}{2}\%$ , (b)  $2\frac{1}{2}\%$ ,  
 (c) 5% on the money invested.
- (29.) At what price will railway 7% stock yield (a) 3%, (b)  $3\frac{1}{2}\%$ ,  
 (c) 5%?
- (30.) Find the percentage obtained on the money invested in railway  
 stock ( $12\frac{1}{2}\%$ ) at  $138\frac{1}{2}$ .
- (31.) When the Four-and-a-quarter per cents are at 95 $\frac{1}{2}$ , what rated  
 interest does an investor get for his money?
- (32.) When a capitalist invests in bank stock ( $12\frac{1}{2}\%$ ) at  $162\frac{1}{2}$ , what  
 rate of interest does he obtain on the money invested?
- (33.) A company's stock is at  $127\frac{1}{2}$ . The declared annual dividend  
 is 17%; what is the rate of interest obtained on the money  
 invested?
- (34.) What is the percentage on money invested in 5% stock at 100?
- (35.) What should be the price of the  $3\frac{1}{2}\%$  when money is worth  
 (a) 3%, (b) 5%?
- (36.) What should be the price of the 3 per cents when money com-  
 mands (a) 5%, (b)  $4\frac{1}{2}\%$ , (c) 2%?
- (37.) When a declared annual dividend of 5% is equivalent to an  
 interest of  $3\frac{1}{2}\%$  upon the money invested, what is the price  
 of the stock?
- (38.) What should be the price of the  $5\frac{1}{2}$  per cents to yield  $2\frac{1}{2}\%$  on  
 the money invested?
- (39.) Which is the better investment, the  $3\frac{1}{2}$  per cents at 95 or the  
 $3\frac{1}{2}$  per cents at par?
- (40.) How much money must be invested in the  $3\frac{1}{2}$  per cents at 91  
 to obtain an income of £500 a year?
- (41.) How much must a person lay out in 7 per cent stock at 154 to  
 secure an income of £54, 7s. 6d. a year?
- (42.) How much must a person invest in the 4 per cent stock at 94  
 to secure an income of £35 per annum?
- (43.) How much must a person lay out in the  $5\frac{1}{2}$  per cents at 115 $\frac{1}{2}$   
 to obtain an income of £78, 2s. 5d. per annum?
- (44.) At what price must a man invest £6110, 17s. 6d. in the 3 per  
 cent stock so as to produce a yearly income of £197 $\frac{1}{2}$ ?
- (45.) What interest per cent per annum is obtained on money invested  
 in the  $4\frac{1}{2}$  per cents at 95?

To find the change of income when money is transferred from one stock to another. Such questions are commonly called "Transfers".

Example:—A person has £5000 stock in the 3% consols at 90; he sells out, and invests in the India 4 per cent stock at 120. Find the difference in his income.

First, find his income in the consols.

Every £100 stock produces £3 income annually; how much would £5000 stock produce?

As £100 : £5000 :: £3 : £150 = 1st income.

Now, sell out the £5000 stock at 90.

$$\begin{array}{r} \text{Every £100 stock sells for 90;} \\ \hline \text{£5000} & " & ? \\ \hline \end{array}$$

As £100 : £5000 :: 90 : £4500 cash.

Invest £4500 in the 4 per cents at 120 and find income:

$$\begin{array}{r} \text{Every £120 produces £4;} \\ \hline \text{£4500} & " & ? \\ \hline \end{array}$$

150

$$\begin{array}{r} \text{As £120 : £4500 :: £4 : } \\ \hline \text{120} & \cancel{4500} \times 4 \\ & \cancel{120} \\ & 3 \end{array} = £150 = 2d \text{ income.}$$

∴ there is no change in his income.

Example.—A man invests £1706, 13s. 4d. in the 4% stock at 128, and immediately sells out at 131 $\frac{1}{2}$ ; what profit does he make?

On every £128 invested he gains £3 $\frac{1}{2}$ . Find his gain on £1706, 13s. 4d.

As £128 : £1706 $\frac{1}{2}$  :: 3 $\frac{1}{2}$  : Ans.

$$\begin{array}{r} 20 \\ 11\cancel{0} \\ \hline 512\cancel{0} \times 7 \\ 3 \times 2 \times 128 \\ \hline 3 \end{array} = \frac{140}{3} = £46, 13s. 4d. \quad \text{Ans.} = £46, 13s. 4d.$$

### Exercise 34.

- (1.) If a person sells £1000 3 per cent stock at 91, and invests the proceeds at 5% at par, by how much is his income increased?
- (2.) How should I affect my income by selling out from the 1 $\frac{1}{2}$  per cents at 47 $\frac{1}{2}$ , and investing in the 3 $\frac{1}{2}$  per cents at 99?
- (3.) A man sells out £1250 stock of 3 per cent consols at 96, and invests the proceeds in railway stock at 75, paying 2 $\frac{1}{2}$  per cent. Find the change in his income.
- (4.) A man has £10,000 in the 3 per cents; he sells out when they are at 65, and invests the proceeds in the 4 per cents at 82 $\frac{1}{2}$ . Find the change in his income.
- (5.) If I buy £1000 stock at 84 $\frac{3}{4}$ , and sell out at 78 $\frac{1}{2}$ , how much do I lose by the transaction?
- (6.) A man has £5600 in the 3 $\frac{1}{2}$  per cents at 93. He sells out and invests in the 5 per cent stock at 110 $\frac{1}{2}$ . Find the change in his income.
- (7.) A man sells £1157 stock out of the 3 per cents at 83 $\frac{1}{4}$ , and invests in the 3 $\frac{1}{2}$  per cents at 90 $\frac{3}{10}$ . Find the change in his income.
- (8.) A person transfers £2000 sterling from the 3 $\frac{1}{2}$  per cents at 99

to the 3 per cents at 86 $\frac{1}{2}$ . What is the difference in income?

- (a) A person invests £1347, 12s. 2d. in railway stock at 11 and sells out immediately at 117 $\frac{1}{2}$ ; find his profit.
- (b) A man buys £6000 stock in the 4 per cents at 98, and receiving one year's dividend sells out at 96 $\frac{1}{2}$ . Find his loss.
- (c) A person sells £3000 consols at 96, and invests in bank stock at 120. How much stock does he now possess?
- (d) A person sells £2820, 16s. 10d. stock at 143 $\frac{1}{2}$ , and buys railway stock at 127 $\frac{1}{2}$ . How much stock does he now possess?
- (e) A man sells out £1500 3 per cents at par and invests in 5 per cents at 120. Find the change in his income.
- (f) A person sells £5500 out of the 2 $\frac{1}{2}$  per cents at 95, and in the 4 $\frac{1}{2}$  per cents at 112 $\frac{1}{2}$ . Find the alteration in his income.
- (g) A man sells £3750 out of the 2 $\frac{1}{2}$  per cents at 93, and tramway stock at 141 paying 6 $\frac{1}{2}$  per cent. Find the change in his income.
- (h) A man makes £73, 10s. profit by investing in the 3 $\frac{1}{2}$  per cents at 95 $\frac{1}{2}$  and selling out immediately at 97 $\frac{1}{2}$ . Find how he invested.
- (i) What should be the price of the 3 per cents so as to be an investment as the 3 $\frac{1}{2}$  per cents at 108 $\frac{1}{2}$ ?
- (j) A person has £2950 in the 3 per cents at 83 $\frac{1}{2}$ . When these have fallen 2 $\frac{1}{2}\%$  he transfers his capital to the 5 per cents at 108. Find the change in his income.
- (k) Find the difference in the incomes arising from £1000 invested in the 3 per cents at 75, and £1000 invested in the 4 per cents at 96.
- (l) A person invests £5460 in the 3 per cents at 91. He sells £2000 of the stock at 93 $\frac{1}{2}$ , and the remainder at 86, and then invests the proceeds in the 4 per cents at 102. Find the change in his income.

### Exercise 35.

- (1) A gentleman invested £2250 in the 5 per cents at 85, and another £2250 in the 4 $\frac{1}{2}$  per cents at 75. Which investment did he find the more profitable, and by how much?
- (2) At what rate per cent will a person receive interest for £100 invested in the 4 per cents at 176?
- (3) A person who inherited £5400 invested half of it in the 3 per cents at 67 $\frac{1}{2}$ , and the rest in the New Two-and-a-half per cent at 86. Which was the better investment, and by how much?
- (4) What sum of money invested in the 3 per cents at 73 $\frac{1}{2}$  will realize a permanent income of £1 per week?
- (5) What sum of money must be invested in 3 per cent consols at 67 $\frac{1}{2}$  to produce an income of £120 a year?
- (6) What must be the market value of a 4 $\frac{1}{2}$  per cent stock if 4% may be obtained on the money invested?

- (7.) What is the price of the four per cents if I buy £1245 stock for £1220, 2s.?
- (8.) How much money must a gentleman invest in the 3 per cents at 87 in order to settle an income of £100 a year upon his daughter?
- (9.) By investing in the 3 per cents a person got  $2\frac{1}{2}$  per cent for his money; at what price was his stock bought?
- (10.) If the  $3\frac{3}{4}$  per cents are at 125, what is the rate per cent per annum obtained on the money invested?
- (11.) Find the income which would be derived from investing £3300, half of it in the  $2\frac{1}{2}$  per cents at  $84\frac{3}{8}$  and the other half in the 4 per cents at  $82\frac{1}{2}$ .
- (12.) What dividend would be derived from investing £3427 in the 3 per cents at  $74\frac{1}{2}$ ?
- (13.) A man has £4275 in the 4 per cents at 80. He sells out and invests in the  $5\frac{1}{2}$  per cents at 99. How is his income affected?
- (14.) What ought to be the price of the 3 per cents when money is worth 5% per annum?
- (15.) Find the price of the  $3\frac{1}{2}$  per cents when an investment of £1352 produces an income of £52 per annum.
- (16.) What sum would have to be invested in the  $3\frac{1}{2}$  per cents at 105 to produce an annual income of £159, 12s.?
- (17.) What rate of interest does money command when the 3 per cent consols are at 40 below par?
- (18.) When the 3 per cents are at 10 per cent discount what sum would have to be invested to produce an income of £216, 2s. 6d.?
- (19.) If the 3 per cents are at  $93\frac{1}{8}$ , what sum of money must be invested to produce an income of £110, 8s.?
- (20.) What is the gain by investing £1950 when the stock stands at  $97\frac{1}{2}$ , and selling out at  $103\frac{3}{8}$ ?
- (21.) Which is the better investment—the 3 per cents at  $64\frac{1}{2}$  or the Canadian 5 per cents at  $102\frac{3}{4}$ ?
- (22.) £935 is invested in the 3 per cents at  $93\frac{1}{2}$ . What is the annual income?
- (23.) A person investing in the 3 per cents receives  $3\frac{1}{3}$  per cent for his money. What is the price of the stock?
- (24.) What sum must be paid for 3700 bank stock at  $211\frac{1}{4}$ ?
- (25.) How much stock at  $65\frac{1}{2}$  will £524 buy?
- (26.) I invested in the  $3\frac{1}{2}$  per cents at  $92\frac{1}{2}$ ; what rate per cent do I get for my money?
- (27.) What should a person give for the 4 per cents so as to get  $3\frac{1}{2}$  per cent for his money?
- (28.) Find the income produced by 6300 of 3 per cent stock; and its sterling value when the stocks are at 95.
- (29.) A person invests £1037, 10s. in the 3 per cents at 83, and when the funds have risen 1 per cent he sells out and invests in the 4 per cents at 96. Find the change in his income.

- (m.) A person invests £2450 in the 3 per cents at 81, and sells out when they have fallen to  $67\frac{1}{2}$ . How much does he lose by the transaction?
- (n.) A person has £3500 in the 3 per cents at  $83\frac{1}{2}$ ; when the funds have fallen  $2\frac{1}{2}$  per cent he transfers his capital to the 5 per cents at 108. Find the alteration in his income.
- (o.) If the 3½ per cents be at 91, how much must a person invest in order to have an income of £233 after paying 7d. in the £ for income-tax?
- (p.) Find the price of the 3 per cent stock when an investment of £434, 12s. 6d. produces an income of £14, 5s.
- (q.) A person invests £2852 in railway shares at 115, the annual dividend on each share being £5. He sells out at 125 and invests in the 3 per cents at 93. Find the change in his income.
- (r.) I sell £43,400 stock out of the 3 per cents at 96, and I buy 6 per cent debenture stock at 105. Find the change in my income.
- (s.) How much  $3\frac{1}{2}$  per cent stock at  $97\frac{3}{4}$  can be purchased for £3519, and what income would be thence derived?
- (t.) I gain £50 by investing in the  $3\frac{1}{2}\%$  at 90 and selling out at 95. How much stock did I buy?
- (u.) A person invests in the  $2\frac{1}{2}$  per cents at 75 and sells out at  $73\frac{1}{2}$ , thereby losing £39. How much did he invest?
- (v.) A person invested £2700 in the 3 per cents at 90 and sells out at a gain of £500. At what price did he sell?
- (w.) A person has £12,000 stock in the  $2\frac{1}{2}$  per cents at 75. He sells out at a loss of £500. At what price does he sell?

### BROKERAGE.

The purchase or sale of stock is generally effected by means of a broker, who charges £ $\frac{1}{8}$  per cent upon the stock bought or sold; so that when a person *buys* stock, every £100 costs him £ $\frac{1}{8}$  more than the quoted price; and when a person *sells* stock he receives £ $\frac{1}{8}$  less for every £100 than the quoted price. Thus if stock be quoted at  $91\frac{1}{2}$ , a man must pay £ $(91\frac{1}{2} + \frac{1}{8})$  or £92 for every £100 stock; on the contrary, the seller will only receive £ $(91\frac{1}{2} - \frac{1}{8})$  or £91 $\frac{3}{4}$  for every £100 stock.

Ex. 1.—How much must be given for £5000 stock at  $104\frac{3}{8}$ , allowing  $\frac{1}{8}$  per cent for brokerage.

In this case every £1000 stock will cost the buyer £ $(104\frac{3}{8} + \frac{1}{8})$  =  $104\frac{1}{2}$ .

∴ As £100 : £5000 ::  $104\frac{1}{2}$

25

Ans.  $5000 \times 209 = £5225$ .

10

Ex. 2:—How much will a man receive from the sale of £5000 stock at £104 $\frac{1}{2}$ , allowing  $\frac{1}{8}$  per cent brokerage?

Here the seller only receives  $(£104\frac{1}{2} - \frac{1}{8}) = £104\frac{1}{2}$  for every £100 stock.

∴ As £100 : £5000 ::  $104\frac{1}{2}$  : Ans.

$$\text{Ans. } \frac{25}{104\frac{1}{2} \times 47} = £5212, 10s.$$

2

Ans. £5212, 10s.

### Exercise 36.

Allow  $\frac{1}{8}$  per cent brokerage in the following questions.

- (1.) How much stock could be bought for £4480 at (a)  $87\frac{3}{4}$ , (b)  $83\frac{7}{8}$ , (c)  $104\frac{1}{2}$ ?
- (2.) How much stock would £5830, 9s. buy at (a)  $72\frac{3}{8}$ , (b)  $108\frac{5}{8}$ , (c)  $104\frac{1}{2}$ ?
- (3.) Find the amount received for £8603, 15s. stock at (a)  $144\frac{5}{8}$ , (b)  $108\frac{5}{8}$ .
- (4.) Find the net amount which a person would receive who sold out £3560, 10s. consols at (a)  $101\frac{3}{8}$ , (b)  $87\frac{3}{8}$ , (c)  $75\frac{1}{2}$ .
- (5.) Find the rate of interest obtained on money invested in the  $2\frac{1}{2}$  per cents when they stand at (a)  $94\frac{3}{8}$ , (b)  $89\frac{7}{8}$ , (c)  $61\frac{1}{2}$ .
- (6.) What is the rate of interest obtained in the five per cents when they are purchased at (a)  $239\frac{7}{8}$ , (b) at par?
- (7.) Find the quoted price of the four per cents to yield (a)  $2\frac{1}{4}\%$ , (b)  $2\%$ , (c)  $5\%$  on the money invested.
- (8.) Find the price at which the 7% stock is quoted to yield (a)  $3\%$ , (b)  $3\frac{1}{2}\%$ , (c)  $5\%$  on the money invested.
- (9.) An income of £52 a year is produced by investing £1890, 4s. in the  $2\frac{1}{2}$  per cents. What is the price of the stock?
- (10.) Find the amount invested in the 5 per cents at  $91\frac{1}{2}$  to produce an annual income of £200.
- (11.) Which is the better investment—the 3 per cents at  $89\frac{1}{2}$  or the  $3\frac{1}{2}$  per cents at  $95\frac{1}{2}$ ?
- (12.) A man invests £8063 in the 3 per cents at  $94\frac{3}{8}$ ; what will be his net income after an income-tax of 10d. in the £ has been deducted?

### CUBE ROOT.

The *Cube Root* of a number is that number which if raised to the third power, will be equal to the number itself. Thus the cube root of 64 is 4.

The sign of the cube root is  $\sqrt[3]{\phantom{x}}$ . Thus  $\sqrt[3]{8}=2$ .

The rule for extracting the cube root will be best understood from an example.

Example:—Extract the cube root of 8'978'161'250'304.

|   |                           |                            |
|---|---------------------------|----------------------------|
|   | 207'84                    |                            |
|   | 8'978'161'250'304         |                            |
| 8   |                           |                            |
| $2^3$   |                           |                            |
| Trial divisor   | $= 300 \times 2^2 = 1200$ | 978161                     |
| New trial divisor   | $= 120000$                | $869743 = 7 \times 124249$ |
| $30 \times 20 \times 7$   | $= 4200$                  | 108418250                  |
| $7^2$   | $= 49$                    | <u>103235552</u>           |
| Real divisor  | $= 124249$                | 5182698304                 |
| $7^2$   | $= 49$                    | <u>5182698304</u>          |
| Trial divisor<br>(found by squaring 7<br>and adding last 4 lines<br>and affixing 2 ciphers) | $= 12854700$              |                            |
| $30 \times 207 \times 8$  | $= 49680$                 |                            |
| $8^2$   | $= 64$                    |                            |
| Real divisor  | $= 12904444$              |                            |
| $8^2$   | $= 64$                    |                            |
| Trial divisor<br>(found as before)  | $= 1295425200$            |                            |
| $30 \times 2078 \times 4$   | $= 249360$                |                            |
| $4^2$   | $= 16.$                   |                            |
| Real divisor  | $= 1295674576$            |                            |
| <i>Ans.</i> = 207'84.   |                           |                            |

We mark off the figures in groups of 3, both to the right and left beginning at the decimal point. We next find a number whose cube is not greater than the first period. In this case it is 2, and its cube is 8, which we set down under the first period and subtract, and then bring down the next period, 978. The *trial divisor* is then found by multiplying 300 by the square of the number already found,  $300 \times 2^2 = 1200$ . In this case 1200 will not go into 978 and consequently we bring down the next period, 161, and to our new trial divisor we simply affix two ciphers to the old one. To obtain our *real divisor* we multiply 30 by 20 (old quotient) by (the new figure) and set this together with  $7^2$  (new figure squared) under the trial divisor, and add up the last 3 lines. We then multiply the real divisor by 7 and subtract the product from the divisor and bring down the next period. The new trial divisor should be found by multiplying 300 by  $207^2$  (quotient squared); but a shorter way of arriving at this result is shown in the solution of the example given above, viz. by squaring the 7 and adding the last 4 lines and affixing two ciphers. The real divisor is then found as already explained, i.e. it is = the trial divisor +  $30 \times 207$  (the old quotient) +  $7^2$ .

To extract the cube root of a mixed number:—If the denominator

of the fraction is an even cube, reduce the mixed number to an improper fraction and then extract the cube root of the numerator and denominator separately.

If the denominator is not an even cube, reduce the fraction to a decimal and extract the cube root as in the example given above.

### Exercise 37.

Find the cube root of—

|              |              |               |               |
|--------------|--------------|---------------|---------------|
| (1.) 328509. | (6.) 205379. | (11.) 614125. | (16.) 531441. |
| (2.) 21952.  | (7.) 493039. | (12.) 970299. | (17.) 884736. |
| (3.) 389017. | (8.) 941192. | (13.) 474552. | (18.) 103823. |
| (4.) 59319.  | (9.) 658503. | (14.) 438976. | (19.) 238328. |
| (5.) 857375. | (10.) 79507. | (15.) 300763. | (20.) 314432. |

Find the value of—

|                            |                               |                               |
|----------------------------|-------------------------------|-------------------------------|
| (21.) $\sqrt[3]{140608}$ . | (26.) $\sqrt[3]{398688256}$ . | (31.) $\sqrt[3]{504358336}$ . |
| (22.) $\sqrt[3]{681472}$ . | (27.) $\sqrt[3]{384240583}$ . | (32.) $\sqrt[3]{551368000}$ . |
| (23.) $\sqrt[3]{195112}$ . | (28.) $\sqrt[3]{515849608}$ . | (33.) $\sqrt[3]{938313739}$ . |
| (24.) $\sqrt[3]{778688}$ . | (29.) $\sqrt[3]{766060875}$ . | (34.) $\sqrt[3]{629422793}$ . |
| (25.) $\sqrt[3]{46656}$ .  | (30.) $\sqrt[3]{233744896}$ . |                               |

Extract the cube root of—

|                      |                      |                      |
|----------------------|----------------------|----------------------|
| (35.) 4·096.         | (43.) 558254·956904. | (52.) 755062·563016. |
| (36.) 97·336.        | (44.) 9·261.         | (53.) 35·937.        |
| (37.) 217·081801.    | (45.) 185·193.       | (54.) 59·319.        |
| (38.) 521·660125.    | (46.) 127·263527.    | (55.) 345·948408.    |
| (39.) 583·411731.    | (47.) 738·763264.    | (56.) 356·400829.    |
| (40.) 304821·217.    | (48.) 240·641848.    | (57.) 181·321496.    |
| (41.) 20279·414583.  | (49.) 122023·936.    | (58.) 376367·048.    |
| (42.) 361857·396376. | (50.) 39861·495296.  | (59.) 242270·420904. |
|                      | (51.) 593339·266827. |                      |

Find the value of—

|  |   |
|--|---|
| (60.) $\sqrt[3]{277040·296359}$ .      | (70.) $\sqrt[3]{8120843·408412008}$ .   |
| (61.) $\sqrt[3]{20435·982904}$ .       | (71.) $\sqrt[3]{216006480·064800216}$ . |
| (62.) $\sqrt[3]{5023053·676376}$ .     | (72.) $\sqrt[3]{8000240·002400008}$ .   |
| (63.) $\sqrt[3]{8978161·250804}$ .     | (73.) $\sqrt[3]{1871737·997260631}$ .   |
| (64.) $\sqrt[3]{1061239·212306001}$ .  | (74.) $\sqrt[3]{5292585·633483}$ .      |
| (65.) $\sqrt[3]{27271716·417127027}$ . | (75.) $\sqrt[3]{17714264·986432}$ .     |
| (66.) $\sqrt[3]{1000030·000300001}$ .  | (76.) $\sqrt[3]{4096076·800480001}$ .   |
| (67.) $\sqrt[3]{1006072·249442408}$ .  | (77.) $\sqrt[3]{125003750·037500125}$ . |
| (68.) $\sqrt[3]{4767928·784191}$ .     | (78.) $\sqrt[3]{8012126·121630301}$ .   |
| (69.) $\sqrt[3]{9222685·958611}$ .     | (79.) $\sqrt[3]{1772088·128273728}$ .   |
|  | (80.) $\sqrt[3]{228356819·487487}$ .    |

Find the cube root of—

|                           |                            |                           |                              |
|---------------------------|----------------------------|---------------------------|------------------------------|
| (81.) 166 $\frac{2}{3}$ . | (85.) 110 $\frac{7}{15}$ . | (89.) 58 $\frac{2}{15}$ . | (93.) 669 $\frac{1}{11}$ .   |
| (82.) 11 $\frac{1}{2}$ .  | (86.) 42 $\frac{7}{8}$ .   | (90.) 54 $\frac{2}{15}$ . | (94.) 699 $\frac{1}{11}$ .   |
| (83.) 307 $\frac{1}{2}$ . | (87.) 144 $\frac{1}{2}$ .  | (91.) 421 $\frac{7}{8}$ . | (95.) 681 $\frac{1}{11}$ .   |
| (84.) 115 $\frac{1}{2}$ . | (88.) 5 $\frac{1}{2}$ .    | (92.) 76 $\frac{2}{3}$ .  | (96.) 14172 $\frac{1}{11}$ . |

Find the value of—

|   |  |
|---|--|
| (97.) $\sqrt[3]{27338\frac{1}{15}}$ .                         | (99.) $\sqrt[3]{2184\frac{1}{15}\frac{1}{15}\frac{1}{15}}$ . |
| (98.) $\sqrt[3]{30451\frac{1}{15}\frac{1}{15}\frac{1}{15}}$ . | (100.) $\sqrt[3]{12703\frac{1}{2}}$ .                        |

---

## ALLIGATION.

Alligation is the mixing of things of the same kind, but of different qualities, so that the composition may be of some intermediate quality.

Example:—A wine merchant blends 30 gallons of sherry at 2*s.* per gallon, 25 gallons at 26*s.* per gallon, and 35 gallons at 32*s.* per gallon. Find the price per gallon of the mixture.

$$\begin{array}{r}
 30 \text{ gallons at } 24\text{s. a gallon} = 720 \\
 25 \quad " \quad 26\text{s.} \quad " \quad = 650 \\
 35 \quad " \quad 32\text{s.} \quad " \quad = 1120 \\
 \hline
 \therefore 90 \text{ gallons of the mixture} = 2490 \\
 \therefore 1 \text{ gallon of the mixture} = 27\text{s. } 6d.
 \end{array}$$

Example:—How must a person mix tea at 2*s.* 4*d.* per lb. with tea at 3*s.* 2*d.* a lb. to produce a mixture worth 2*s.* 8*d.* a lb.?

Mean price  $\left\{ \begin{array}{l} 2/4 \text{ on this there is a gain of } 4d. \text{ per lb.} \\ 2/8 \qquad \qquad \qquad \text{loss of } 6d. \end{array} \right. \times \begin{array}{l} 6 \text{ of the } 2/4 \\ 4 \text{ of the } 3/2 \end{array}$

In order that the gain in using the former may be counterbalanced by the loss in using the latter, we must take 6 lbs. of the former for every 4 lbs. of the latter. We therefore take the quantities in the ratio of 6 to 4 or of 3 to 2, that is, in the inverse ratio of the difference of the two prices and the mean price.

Ans. 3 at 2*s.* 4*d.* with 2 at 3*s.* 2*d.*

Example:—A merchant mixes wines at 14*s.*, 15*s.*, and 19*s.* per gallon to produce a mixture worth 16*s.* per gallon. How does he mix them?

$$\text{Mean price } 16\text{s.} \left\{ \begin{array}{l} 14, \text{ gain of } 2s. \text{ per gall.} \\ 15, \quad " \quad 1s. \quad " \\ 19, \text{ loss of } 3s. \quad " \end{array} \right. \times \begin{array}{l} 3 \\ 3 \\ 2+1=3 \end{array} = 3$$

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First, mix the wines at 14*s.* and 19*s.* to get a mixture at the mean price by the last example. Second, mix those at 15*s.* and 19*s.* to get a mixture at the mean price: the sum of these mixtures will give a mixture of all three at the mean price.

∴ Ans. 3 at 14*s.*, 3 at 15*s.*, and 3 at 19*s.*,  
or 1 at 14*s.*, 1 at 15*s.*, and 1 at 19*s.*

Example:—How must a grocer mix teas at 2*s. 5d.*, 2*s. 8d.*, 2*s. 11d.* and 3*s. 2d.* to have a mixture worth 2*s. 10d.* per lb.?

$$\text{Mean price } 3\frac{1}{4} \left\{ \begin{array}{l} \text{d.} \\ \text{29, gain of 5} \\ \text{32, " " 2} \\ \text{35, loss of 1} \\ \text{38, " " 4} \end{array} \right. \left\{ \begin{array}{l} \text{d.} \\ 4=4 \text{ at } 2\text{s. 5d.} \\ 1=1 \text{ at } 2\text{s. 8d.} \\ 2=2 \text{ at } 2\text{s. 11d.} \\ 5=5 \text{ at } 3\text{s. 2d.} \end{array} \right\} \text{Ans.}$$

or,

$$\text{Mean price } 3\frac{1}{4} \left\{ \begin{array}{l} \text{d.} \\ \text{29, gain of 5} \\ \text{32, " " 2} \\ \text{35, loss of 1} \\ \text{38, " " 4} \end{array} \right. \left\{ \begin{array}{l} \text{d.} \\ 1=1 \text{ at } 2\text{s. 5d.} \\ 4=4 \text{ at } 2\text{s. 8d.} \\ 5=5 \text{ at } 2\text{s. 11d.} \\ 2=2 \text{ at } 3\text{s. 2d.} \end{array} \right\} \text{Ans.}$$

Either of these proportions will give the required mixture.

If in this example we were required to find how many lbs. at 2*s. 5d.*, 2*s. 8d.*, and 2*s. 11d.* should be mixed with 20 lbs. at 3*s. 2d.* to produce a mixture worth 2*s. 10d.*, we would proceed as follows:—

Taking the proportion given by the first solution, the numbers are in order 4 1 2 5.

Multiply each of these numbers by  $\frac{20}{5}$  or 4, and we get  
16 4 8 20, and therefore

Ans. 16 at 2*s. 5d.*, 4 at 2*s. 8d.*, and 8 at 2*s. 11d.*

### Exercise 38.

- (1.) If a tobacconist mixes 10 ozs. of snuff worth 4*½d.* per oz., 8 ozs. worth 5*¾d.* per oz., 4 ozs. worth 6*½d.* per oz., and 6 ozs. worth 8*½d.* per oz., what will the mixture be worth per oz.?
- (2.) Three kinds of wine are mixed as follows:—2 gallons at 10*s.* per gal., 5 at 15*s.*, and 3 at £1 per gal. Find the value of the mixture per gallon.
- (3.) A distiller mixes whiskies as follows:—12 gallons at 18*s.* per gal., 10 gals. at 18*s. 6d.*, 8 gals. at 19*s.*, and 6 gals. at £1 per gal. Find the value of the mixture per gallon.
- (4.) A grocer mixes teas as follows:—20 lbs. at 2*s. 6d.* a lb., 16 lbs. at 3*s. a lb.*, and 12 lbs. at 3*s. 4d.* a lb. Find the value of the mixture per lb.
- (5.) How should a grocer mix coffee worth 1*s. 5d.* and 2*s. 8d.* a lb. respectively in order to produce a mixture worth 1*s. 11d.* a lb.?

- (a) How should two kinds of wheat be mixed, worth respectively 3s. and 5s. per quarter, to produce a mixture worth 4s. per quarter?
- (b) How must sugar be mixed, worth 4d., 6d., and 7½d. per lb., to produce a mixture worth 5½d. per lb.?
- (c) How must oats at 2s. 8d., 3s. 4d., 3s. 8d., and 4s. per bushel be mixed to produce a mixture worth 3s. 6d. per bushel?
- (d) How must potatoes at 2s. 8d., 2s. 11d., and 3s. 3d. per cwt. be mixed to produce a mixture worth 3s. per cwt.?
- (e) How must wines which cost £80 and £100 per cask be mixed, so that when the mixture is sold at £94, 10s. per cask the merchant may gain 5% on his money?
- (f) How much tea at 2s. 6d. per lb. must be mixed with 180 lbs. at 3s. 4d. per lb. so that the value of the mixture may be 3s. per lb.?
- (g) Mix spirit at 9s. a gallon, wine at 7s. a gallon, and cider at 1s. a gallon with water, so that the mixture may be worth 6s. a gallon.
- (h) Mix 9 ozs. of gold 12 carats fine, 5 ozs. 18 carats fine, 4 ozs. 2 carats fine, 3 ozs. of pure gold, and 2 ozs. of standard gold; find the value of the mixture. *Pure gold is 24 carats fine, and standard gold is 22 carats fine.*
- How should tea at 2s. 6d. be mixed with tea at 3s. 6d. so that 10% may be gained by selling the mixture at 3s. 2½d. per lb.?
- (i) Wines are at 10s. per gallon and 6s. per gallon. What quantity of each must be mixed with 44 gallons of Fr. brandy at 18s. per gallon that the mixture may be worth 12s. per gallon?
- (j) What quantities of wheat, worth 5s., 4s. 6d., and 4s. per cwt., must be mixed with 30 cwts., worth 6s. per cwt., so that the mixture may be worth 4s. 9d. per cwt.?

### CHAIN RULE.

When we are given a series of quantities of different kinds, and we are also given the relations existing between the first and second, and between the second and third, &c., we can find what quantity of the last kind is equal to a given quantity of the first kind by the CHAIN RULE.

Example.—If 2 bookcases are worth 3 couches, and 2 couches = 9 easy-chairs, and 3 easy-chairs = 16 mahogany chairs, and 24 mahogany chairs = 20 guineas, find the value of a bookcase in £ s. d.

|                    |                      |
|--------------------|----------------------|
| ? £ s. d.          | = 1 bookcase         |
| 2 bookcases        | = 3 couches          |
| 2 couches          | = 9 easy-chairs      |
| 3 easy-chairs      | = 16 mahogany chairs |
| 24 mahogany chairs |                      |

$$\therefore \text{Value of 1 bookcase} = \mathcal{L} \frac{1 \times 3 \times \frac{3}{2} \times 16 \times 21}{2 \times 2 \times 3 \times 24} = \mathcal{L} \frac{63}{2} = \mathcal{L} 31, 10s.$$

$\frac{3}{2}$

From the foregoing solution we may notice:

- (1) That we write in the form of an equation the question asked.
- (2) That the right-hand side of one equation is of the *same kind* as the left-hand side of the next equation. *Besides being of the same kind they must also be of the same denomination.*
- (3) That the answer is obtained by dividing the product of the numbers on the right-hand side by the product of the numbers on the left-hand side.

Questions in exchange are worked by this rule.

Example.—Express 32 Spanish piastres in French money, exchange being at the rate of  $25\frac{1}{2}$  francs for £1 and £3, 7s. 6d. for 20 piastres.

|                |   |                            |
|----------------|---|----------------------------|
| ? French money | = | 32 Spanish piastres        |
| 20 piastres    | = | $\mathcal{L} 3\frac{3}{4}$ |
| £1             | = | $25\frac{1}{2}$ francs.    |

$$\text{Ans. } \frac{32 \times 3\frac{3}{4} \times 25\frac{1}{2}}{20 \times 1} \text{ francs.} = \frac{32 \times \frac{15}{4} \times 76}{8 \times 3 \times 20} = \frac{684}{5} = 136\frac{4}{5} \text{ francs.}$$

### Exercise 39.

- (1) If a horse were worth 3 ponies, 2 ponies worth 5 mules, 3 mules worth 7 donkeys, 5 donkeys worth a dozen dogs, and a dog were worth 9 half-crowns, find the value of a horse.
- (2) If 6 turkeys are equal in value to 15 geese, 5 geese to 16 fowl, 50 fowl to a pig, and 6 pigs sell for £30, find the price of a turkey.
- (3) If 1 goose = 3 ducks, 2 ducks = 3 hens, 2 hens = 7 pigeons, 6 pigeons = 3 chickens, and a chicken cost a florin, find the price of a goose.
- (4) If 2 lbs. of damsons are equal in value to 5 lbs. of blackberries, 3 lbs. of blackberries = 2 lbs. of raspberries, 4 lbs. of raspberries = 3 lbs. of apples, 3 lbs. of apples = 2 lbs. of strawberries, and strawberries are 6d. per lb., find the price of damsons.
- (5) If 2 horses cost as much as 3 cows, 2 cows as much as 11 sheep, 5 sheep as much as 2 pigs, 4 pigs as much as 3 ponies, and £100 would buy 5 ponies, find the price of a horse.
- (6) If a pianoforte is worth 3 harmoniums, 2 harmoniums = 5 violins, 2 violins = 3 guitars, 9 guitars = 2 American organs, and an American organ is worth £15, find the value of the pianoforte.
- (7) If 2 turkeys are worth as much as 3 geese, 4 geese = 7 ducks,

- 3 ducks = 4 hens, 3 hens = 4 rabbits, 3 rabbits = 2 hares, and a hare costs 3 shillings, find the cost of a turkey.
- (8.) If a cow = 7 sheep, 2 sheep = 3 goats, 7 goats = 2 pigs, 7 pigs = 2 ponies, and a pony is worth twenty guineas, what is a cow worth?
- (9.) The value of an oak-tree is the same as that of 2 beech-trees, 6 beeches = 7 elm-trees, 4 elm-trees = 9 pine-trees, 7 pine-trees = 8 ash-trees, and 3 ash-trees = 7 fir-trees, which last are worth a guinea each; find the value of the oak-tree.
- (10.) If a youth's overcoat cost as much as 2 pairs of trousers, 6 pairs of trousers as much as 7 jackets, 3 jackets as much as 7 vests, 5 vests as much as 9 shirts, and 4 shirts were bought for a sovereign, find the cost of the overcoat.
- (11.) If 2 cows cost as much as 9 sheep, 3 sheep as much as 8 pigs, 3 pigs as much as 8 turkeys, 4 turkeys as much as 9 fowl, and a fowl realized two shillings, what would the cow realize?
- (12.) Find the cost of a donkey if 3 cost as much as 5 dogs, 7 dogs as much as 16 hares, 2 hares as much as 5 guinea-pigs, 6 guinea-pigs as much as 7 rabbits, and 14 rabbits were bought for 3 guineas.
- 

## ARITHMETICAL PROGRESSION.

Quantities are said to be in Arithmetical Progression when they increase or decrease by a common difference.

The following series are in Arithmetical Progression:—

$$\begin{aligned} & 2, 5, 8, 11, 14, \dots \\ & 20, 18, 16, 14, \dots \\ & a, a+d, a+2d, a+3d, \dots \end{aligned}$$

The common difference is found by subtracting any term from the one immediately following it. In the first series the common difference is 3; in the second, it is -2; and in the third, it is  $d$ .

Let  $a$  be the first term of an Arithmetical Progression,  $d$  the common difference, then the

$$\begin{aligned} \text{2nd term is } & a+d, \\ \text{3rd } " & a+2d, \\ \text{4th } " & a+3d, \\ \cdots & \cdots \cdots \cdots \cdots \\ \text{nth term is } & a+(n-1)d. \quad (1.) \end{aligned}$$

To find the sum of a given number of terms.

Let  $a$  = the 1st term,  $d$  = the common difference,  $n$  = the number of terms,  $l$  = the last term, and  $s$  = the sum of the terms. Then

$$s = a + (a+d) + (a+2d) + (a+3d) + \dots + l.$$

Also by writing the terms in a reverse order we have

$$s = l + (l - a) + (l - 2a) + (l - 3a) + \dots + a.$$

And, therefore, by addition,

$$2s = (l + a) + (l + a) + (l + a) + \dots \text{to } n \text{ terms} = n(l + a);$$

$$\therefore s = \frac{n}{2}(l + a). \quad (2.)$$

But by equation (1) the *n*th or *last* term  $= a + (n - 1)d$ .

$\therefore$  substituting this value of *l* in equation (2) we get

$$s = \frac{n}{2} \left\{ a + (n - 1)d + a \right\}. \quad \therefore s = \frac{n}{2} \left\{ 2a + (n - 1)d \right\}. \quad (3.)$$

Equations (1), (2), and (3) are those used in the solution of questions in Arithmetical Progression—the particular one to be selected depends upon what is given in the question.

Example 1:—Find the 8th term of a series whose first term is 5, and common difference 3.

$$l = a + (n - 1)d. \quad \left\{ \begin{array}{l} a = 5, d = 3, \text{ and} \\ \therefore \text{the 8th term} = 5 + 7 \times 3 = 5 + 21 = 26. \quad \left\{ \begin{array}{l} n = 8. \\ \end{array} \right. \end{array} \right.$$

*Ans.* = 26.

Example 2:—Find the sum of the series 1, 3, 5, 7, &c. to 20 terms.

$$a = 1, \quad n = 20, \quad d = 2.$$

Since the last term is not given in this case, we employ equation (3).

$$s = \frac{n}{2} \left\{ 2a + (n - 1)d \right\} = \frac{20}{2} \{ 2 + 19 \times 2 \} = 10 \times 40 = 400.$$

*Ans.* = 400.

Example 3:—Insert 4 arithmetical means between 2 and 17.

In this case we are given the number of terms—the 1st term and the last term—and we only require to find the common difference. We therefore employ equation (1).

The number of terms = 4 means + 2 extremes = 6.

$$\begin{aligned} l &= a + (n - 1)d. \\ \therefore 17 &= 2 + 5d; \\ \therefore 15 &= 5d; \\ \therefore d &= 3. \end{aligned}$$

Therefore the complete series is 2, 5, 8, 11, 14, 17.

(The case where *a*, *d*, and *s* are given, to find *n* involves a quadratic equation, and is therefore not given here.)

### Exercise 40.

Find the last term of each of the following series:—

- |                                 |  |
|---------------------------------|--|
| (1.) 1, 4, 7, &c. to 9 terms.   | (3.) 7, 12, 17, &c. to 14 terms.                           |
| (2.) 3, 9, 15, &c. to 11 terms. | (4.) 8, 5, 2, &c. to 7 terms.                              |
|                                 | (5.) $1\frac{1}{2}$ , 3, $4\frac{1}{2}$ , &c. to 20 terms. |

Find the sum of each of the following series:—

- |                                     |  |
|-------------------------------------|--|
| (6.) 7, 9, 11, &c. to 30 terms.     | (8.) 4, 3, 2, 1, &c. to 14 terms.  |
| (7.) 1, 2, 3, 4, &c. to 20 terms.   | (10.) $\frac{1}{2}$ , $1\frac{1}{2}$ , $2\frac{1}{2}$ , &c. to 20 terms. |
| (8.) 5, 8, 11, 14, &c. to 12 terms. | (11.) 1, 8, 15, &c. to 100 terms.  |
|                                     | (12.) 7, $5\frac{1}{2}$ , 4, &c. to 11 terms.                            |

- (13.) Insert 3 arithmetical means between 12 and 20.
  - (14.) Insert 5 arithmetical means between 14 and 16.
  - (15.) Insert 7 arithmetical means between 8 and -4.
  - (16.) Insert 8 arithmetical means between -1 and 5.
  - (17.) The first term of an Arithmetical Progression is 5, and the 9th term is 37. What is the common difference?
  - (18.) How many times does the hammer of an ordinary clock strike the bell in 12 hours?
  - (19.) The first term of an Arithmetical Progression is 7, and the common difference is  $-\frac{2}{3}$ ; find the 9th term.
  - (20.) 100 stones are placed on the ground at distances of one yard apart, how far will a person travel who brings them, one by one, to a basket placed one yard in front of the first stone.
- 

### GEOMETRICAL PROGRESSION.

Quantities are said to be in Geometrical Progression when each term is equal to the product of the preceding and some constant factor. The constant factor is called the *common ratio* of the series.

The following series are in Geometrical Progression:—

$$\begin{aligned} & 2, 6, 18, 54 \dots \\ & 2, \frac{2}{3}, \frac{2}{9}, \frac{2}{27} \dots \\ & a, ar, ar^2, ar^3 \dots \end{aligned}$$

The common ratio is found by dividing any term by the one immediately preceding it. In the first series the common ratio is 3; in the second, it is  $\frac{1}{3}$ ; in the third, it is  $r$ .

Let  $a$  be the first term of a geometric series;  
 "  $r$      "     common ratio.

Then the 2d term is  $ar$ ;  
 " 3d "  $ar^2$ ;  
 " 4th "  $ar^3$ ;  
 ... ... ... ...  
 ... ... ... ...  
 ∴ nth term is  $ar^{n-1}$ . (1.)

To find the sum of a given number of terms of a Geometrical Progression.

Let  $a$  = the first term,  $r$  = the common ratio,  $n$  = the number of terms,  $s$  = the sum of the series.

$$\begin{aligned} \text{Then } s &= a + ar + ar^2 + ar^3 + \dots + ar^{n-1}, \\ \therefore sr &= ar + ar^2 + ar^3 + ar^4 + \dots + ar^{n-1} + ar^n \\ \therefore \text{by subtraction:} \\ s(r-1) &= ar^n - a; \\ \therefore s &= \frac{a(r^n - 1)}{r-1}. \quad (2.) \end{aligned}$$

Equations (1) and (2) are those required in the solution of questions in Geometrical Progression.

When  $r$  is less than unity equation (2) is written—

$$s = \frac{a(1 - r^n)}{1 - r}.$$

**Example 1:**—Find the 5th term of the series 2, 12, 72, &c.

The last or nth term of a series =  $ar^{n-1}$ ;  
 ∴ the 5th term =  $2 \times 6^4 = 2592$ .

**Example 2:**—Find the sum of 6 terms of the series 1, 3, 9, 27.....

Here  $a = 1$ ,  $r = 3$ ,  $n = 6$ ;

$$\therefore s = \frac{1(3^6 - 1)}{3 - 1} = \frac{729 - 1}{2} = 364.$$

**Example 3:**—Find the sum of 7 terms of the series 8, -4, 2, -1.....

Here  $a = 8$ ,  $r = -\frac{1}{2}$ , and  $n = 7$ .

$$\begin{aligned} s &= \frac{a(1 - r^n)}{1 - r} = \frac{8\{1 - (-\frac{1}{2})^7\}}{1 - (-\frac{1}{2})} = \frac{8(1 + \frac{1}{128})}{1 + \frac{1}{2}} = 1\frac{2}{3} \times \frac{2}{3} = \frac{4}{3}. \\ \text{Ans.} &= 5\frac{1}{3}. \end{aligned}$$

**Example 4:**—Insert 3 geometrical means between 2 and 32.

Here  $n = 3$  means + 2 extremes = 5;  
 $l = 32$ ;  
 $a = 2$ .

We have therefore to find  $r$ .

$$\begin{aligned}l &= ar^{n-1}, \\ \therefore 32 &= 2 \times r^4; \\ \therefore r^4 &= 16; \\ \therefore r &= 2.\end{aligned}$$

$\therefore$  the complete series is 2, 4, 8, 16, 32.

### Exercise 41.

Find the sum of each of the following series:—

- (1.) 1, 4, 16, &c. to 6 terms.
  - (2.) 2, 4, 8, &c. to 7 terms.
  - (3.) 5, 15, 45, &c. to 5 terms.
  - (4.) Find the 6th term of 2, 8, 32, &c.
  - (5.) Find the 7th term of 3, 9, 27, &c.
  - (6.) Sum  $\frac{2}{3}, \frac{1}{2}, \frac{1}{3},$  &c. to 6 terms.
  - (7.) Sum  $\frac{2}{3}, -1, \frac{2}{3},$  &c. to 7 terms.
  - (8.) Insert 3 geometrical means between 1 and 256.
  - (9.) Insert 4 geometrical means between  $5\frac{1}{3}$  and  $40\frac{1}{3}$ .
  - (10.) The owner of a horse being asked how much he'd take for the steed, replied,  $\frac{1}{2}d.$  for the first nail in the animal's shoes  $+\frac{1}{2}d.$  for the 2nd  $+1d.$  for the 3rd, and so on for the 32 nails. How much did the owner ask for the horse?
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### EXAMINATION EXERCISES FOR VI<sup>2</sup>.

#### SET I.

##### A1.

- (1.) One man eats 8 lbs. of bread in 6 days, how much would 340 men use in the year 1884?
- (2.) If 5 men by working 8 hours a day can earn £30 in 20 days, how much would 18 men earn in 15 days working 10 hours a day?
- (3.) Find the (a) sum, (b) difference, and (c) product of  $5\frac{2}{3}$  and  $6\frac{1}{2}$ .
- (4.) How much money invested in the 3 per cents at 95 will produce an income of £120 per annum?
- (5.) Find the commercial discount on £50 due on the 3rd July and discounted on the previous 9th March at  $2\frac{1}{2}\%$ .
- (6.)  $\sqrt{4\frac{5}{16}}$ .

##### B1.

- (1.) Reduce  $\frac{56}{725}$  to its lowest terms.
- (2.) If 12 horses plough  $13\frac{1}{2}$  acres in 18 days, in how many days would 30 horses plough 54.

- (3.) A man buys 50 articles for £6, 5s., and sells them at  $3\frac{1}{2}$  guineas per score; find his gain or loss per cent.
- (4.) If the threepenny loaf weighs 20 ozs. when wheat is 4s. per cwt., find the weight of the fivepenny loaf when wheat is 5s. per cwt.
- (5.) How much invested in the  $3\frac{1}{2}\%$  stock at 90 would produce £490 a year?
- (6.) Find the price of 18 cwts. 2 qrs. 14 lbs. at £4, 16s. 3d. per cwt.

## C1.

- (1.) Express the  $\frac{2}{3}$  of  $\frac{5}{6}$  of 16s. 8d. as the decimal of 1 guinea.
- (2.) Find the discount on a 5 months' bill for £300 drawn on 9th March and discounted on the 5th May at  $2\frac{1}{2}\%$ .
- (3.) Find the price of 3 lbs. 7 ozs. 5 dwts. 17 grs. at £12, 7s. 8d. per lb.
- (4.) A person leaves the  $\frac{2}{3}$  of £3000 to one person, and the  $\frac{1}{6}$  to another. How much remains, and what is its value?
- (5.) Find the interest on £835 for 2 yrs. 35 dys. at 3%.
- (6.)  $\sqrt{89.73}$  to 4 decimal places.

## D1.

- (1.) Multiply 35.72 by 17.9.
- (2.) Find the price of 18 ozs. 12 dwts. 10 grs. at 16s. 8d. per oz.
- (3.) By working 8 hrs. a day the  $\frac{2}{3}$  of a piece of work can be done in  $15\frac{1}{2}$  days. How long would it take to complete the work by working 9 hours a day?
- (4.) What principal would produce £5, 3s. 4d. in 73 days at  $2\frac{1}{2}\%$ ?
- (5.) Find the G.C.M. of 832 and 8496.
- (6.) Find the cost price of an article sold for £85 at a loss of 15%.

## E1.

- (1.) What ready money would be realized by the sale of £8000 stock at  $107\frac{1}{2}\%$ ?
- (2.) Divide 9.076 by .083.
- (3.) Convert .089 into a vulgar fraction in its lowest terms.
- (4.) Find the cost price of an article which was sold for 12s. 6d. at a loss of 10%.
- (5.) Divide  $8\frac{3}{4}$  by  $3\frac{1}{2}$ , and express your answer as a decimal.
- (6.) If 5 men can do a piece of work in 5 days, in how many days could 12 men do the  $\frac{2}{3}$  of the work?

## F1.

- (1.) Find the price of 3 tons 12 cwts. 2 qrs. at £2, 5s. per cwt.
- (2.) Find the missing term:—.076 : ? :: .8 : 6.75.
- (3.) What principal would produce £80 in 80 days at  $2\frac{1}{2}\%$ ?
- (4.) If 18 men would do a piece of work in 12 days, how many men would do the  $\frac{1}{3}$  of the work in  $\frac{1}{2}$  of the time?

- (a.) How many times is 18 cubic feet 640 cubic inches contained in  
6 cubic yards 21 cubic feet 1216 cubic inches?  
(a.) Express 3 ozs. 12 dwts. 5 grs. as the decimal of 1 lb. Troy.

## N1.

- (1.) If  $8\frac{1}{2}$  ozs. cost £2 $\frac{1}{2}$  what would  $5\frac{5}{8}$  lbs. cost?  
(2.) Bought 8 cwts. at £15, 7s. 6d. per cwt., and sold it at 3s. 4d. per lb.; find the gain or loss per cent.  
(3.) At what rate per cent would the simple interest on £566, 6s. 8d. amount to £70, 15s. 10d. in  $2\frac{1}{2}$  years?  
(4.) If 80 men would dig a trench 240 feet long 3 feet broad & 2 feet deep in 6 days, working 10 hours a day, in how many days would 60 men dig a trench 420 feet long 1 foot broad and 3 feet deep, working 8 hours a day?  
(5.) What income would be derived from investing £1474 in the 3% at 96?  
(6.)  $\sqrt[3]{829.7374}$

## O1.

- (1.) If the  $\frac{5}{8}$  of a wall be built in 18 days, in what time would the remainder be completed?  
(2.) Simplify  $\frac{(\cdot 5 + \frac{2}{3}) \times \frac{9}{4}}{\frac{1}{2} + \frac{6}{5} + \frac{6}{9}}$ .  
(3.) A invests £308 for  $2\frac{1}{2}$  years, B £935 for 1 year, and C £340 for  $4\frac{1}{2}$  years; how should a profit of £1000 be divided among them?  
(4.) Find the cube root of  $9\frac{15}{343}$ .  
(5.) A man invests £14,400 in the  $3\frac{1}{2}\%$  at 90 and sells out at 96. He then invests the proceeds in the 3 per cents at 74. Find the change in his income.  
(6.) What was the prime cost of a horse which was sold for £35, 1s. at a gain of  $7\frac{1}{4}\%$ ?

## P1.

- (1.) A can do a piece of work in 5 days, B in 4 days, and C in 3 days. How much of it would the three of them do in half a day?  
(2.) Find the selling price of an article which cost £140 and was sold at a loss of  $13\frac{3}{4}\%$ .  
(3.) A owns  $\frac{1}{4}$  of a field and B owns the remainder. A has 5 acres 2 roods 10 perches more than B. Find the area of the field.  
(4.) If 8 men drink  $37\frac{1}{2}$  of a cask of beer in 5 days, how long would it take 15 men to drink the remainder?  
(5.)  $\sqrt[3]{9\frac{2}{5}}$  to 3 places.  
(6.) Simplify  $\frac{6}{7} + \frac{7\frac{3}{4} - 6\frac{1}{2}}{2\frac{1}{3} \times 9}$ .

## Q1.

- (1.) A man buys 100 articles for £12, 10s. and sells them at  $2\frac{1}{2}$  guineas per doz. Find his gain or loss per cent.
- (2.) How much must I invest in the  $7\frac{1}{2}\%$  at 150 to secure an income of £225 per annum?
- (3.) One soldier uses 8 lbs. of bread in 5 days, how much would 85 men use in the year 1876?
- (4.) Express the  $\frac{2}{3}$  of  $\frac{5}{6}$  of 2s. 6d. as the decimal of one guinea.
- (5.) What ready money can be realized by the sale of £1961, 15s. stock at  $87\frac{1}{2}\%$ ?
- (6.) Find the missing term:

$$.084 : ? :: 7 : .57.$$

## R1.

- (1.) How much water must be added to 252 gallons of brandy worth £1 per gallon that the mixture may be worth 16s. per gallon?
  - (2.) By investing £500 in the 3% stock I secured an annual income of 16 guineas. At what price did I buy?
  - (3.) What decimal of £1 must be added to .09 of £6, 13s.  $4\frac{1}{2}$ d. that the result may be £1, 10s. 10d.?
  - (4.) In how many days would £2000 produce £36 at  $4\frac{1}{2}\%$ ?
  - (5.)  $\sqrt[4]{1}$  to 4 places.
  - (6.) Find the amount of £400 for 4 years at 5% compound interest.
- 

## SET II.

## A2.

- (1.) A grocer buys tea and sells it at £9, 19s.  $1\frac{1}{2}$ d. per cwt., thereby gaining  $33\frac{1}{3}\%$ ; find the cost price per lb.
- (2.) If 64 men do the  $\frac{1}{2}$  of a piece of work in a certain time, how many men could do the  $\frac{1}{4}$  of it in the same time?
- (3.) If 5% be lost by selling tea at 3s. 2d. per lb., at what price per lb. should it be sold to gain 10%?
- (4.) How much does a person gain by investing £3900 in the 3% at  $97\frac{1}{2}$  and selling out at  $103\frac{7}{8}$ ?
- (5.) If for the loan of £702, from 18th August to 11th November, I receive £3, 10s. 9d.; how much should I receive for the loan of £408 from 16th March to 27th September?
- (6.) At what rate % would £1725 produce £138 yearly?

## B2.

- (1.) After spending  $\frac{7}{15}$  of my money I lost  $\frac{2}{3}$  of the remainder. I then spent  $\frac{2}{3}$  of what still remained and had £60; what had I at first?

(977)

- (3.) 24 men undertook to do a piece of work in 15 days. After 3 days 8 men retired. How long did the remainder take to finish the work?
- (4.) What sum would produce £30 more if invested in the 5% at par than if invested in the 3% at 90?
- (5.) A and B together can do a piece of work in 10 days. With C's assistance they can do it in 8 days. How long would it take C alone?
- (6.) The prime cost of 2 eggs is 1½d.; they were sold at 1s. Find the gain or loss %.
- (7.) Divide £480 among three persons, giving the first 3 times as much as the second, and the 3rd twice as much as the other two together.

## C2.

- (1.) If 66 men can do a piece of work in 22 days of 8 hours each; how many boys could do the work in the same time, if 3 men = 5 boys?
- (2.) Find the G.C.M. of 126, 168, and 238.
- (3.) What per cent per annum does a person get for his money who invests in the 3% at 90?
- (4.) What principal will produce £46, 9s. 6d. in 11 years at 3½%?
- (5.) Simplify  $\frac{\frac{2}{3} \text{ of } 10\frac{1}{2}}{\frac{3}{4} \text{ of } 4\frac{1}{2}}$ .
- (6.) I bought tea at 1s. 6d. a lb. and sold it at £9, 6s. 8d. per cwt. Find the gain or loss %.

## D2.

- (1.) If 14 ozs. of gold 15 carats fine were mixed with 10 ozs. 12 carats fine; how many ounces of pure gold would be in 8 ozs. of the mixture?
- (2.) At what price would the 2½% stock be as good an investment as the 3% at 90?
- (3.) If 40 men can do a piece of work in 13 days of 8½ hours each, in what time would 30 men do a piece of work 12 times as large working 9½ hours a day?
- (4.) By investing a certain amount in the stocks at 95 and selling out at 93½ I lost £28; find the amount.
- (5.)  $\sqrt[3]{218.5}$  to 2 places.
- (6.) Find the rent of 82·7 acres at £1, 17s. 6d. per acre.

## E2.

- (1.) Which is the better investment, 3% stock at 90 or the 3½% at 99?
- (2.) An arithmetical progression consists of 30 terms, the extremes are 180 and 60. Find the sum of the series.
- (3.) Convert 324½ of a ton into cwts.
- (4.) C's capital is £280 and D's £340. How would a loss of £64 10s. be divided among them?

- (5.) If 30 men could do a piece of work in 20 days, how many men could do  $\frac{2}{3}$  of the work in  $\frac{1}{3}$  of the time?  
 (6.) Divide  $1\frac{4}{7}$  by  $2\frac{1}{4}$ , and express the result as a decimal.

## F 2.

- (1.) Bought 5 tons at £3 per cwt. and sold the stuff at 8d. per lb.; find the gain or loss per cent.  
 (2.) Sold goods at 15s. and lost 10%. How should I sell them so as to neither gain nor lose?  
 (3.) If 18 boys do a piece of work in 28 days, how long would it require 30 girls to do it; suppose 10 girls can do as much as 7 boys.  
 (4.) Find the income arising from the possession of £830 in the 3% at 83.  
 (5.) If  $8\frac{1}{2}$  lbs. can be bought for  $2\frac{1}{4}$  crowns, how much could be got for '49 of a guinea?  
 (6.) Two numbers are in the ratio of 14 : 18; what fraction of their sum is their difference?

## G 2.

- (1.) Pencils are sold at the rate of 9 for  $7\frac{1}{2}$ d., thereby gaining 10%. What per cent will be gained or lost by selling them at 10d. per dozen?  
 (2.) What distance added to .45 of a mile would give .875 of a league?  
 (3.) At what rate per cent would £835 amount to £1000 in 5 years?  
 (4.)  $\sqrt[3]{8\frac{1}{2}}$  to 2 places.  
 (5.) Insert 6 arithmetical means between 17 and 35.  
 (6.) 17 men can reap 17 acres in 1 day; 6 of them only reap half an acre each. How much can each of the others reap in 1 day?

## H 2.

- (1.) What is the rate % of deduction in rent when 6s.  $7\frac{1}{2}$ d. is deducted from £13, 5s.?  
 (2.) An arithmetical progression consists of 37 terms; one extreme is 84 and the sum of the terms is 8436. Find the other extreme.  
 (3.) Employing a false stone of  $13\frac{1}{2}$  lbs. a shopkeeper sold at 2s. 4d. a stone what appeared to be 8 stones of flour. He afterwards returned the overcharge; how much did the purchaser get back?  
 (4.)  $\sqrt[3]{5\frac{1}{2}}$  to 4 places.  
 (5.) Find the missing term, .096 : 4.8 :: ? : 27.8.  
 (6.) Find the price of 100 sheep and 240 lambs at £2, 10s. for a sheep and 5 lambs = 3 sheep.

## I 2.

- (1.) If a number be added to  $\frac{2}{3}$  of  $8\frac{1}{2}$ , the result would be  $\frac{5}{6}$  of 198. Find the number.

- (1) Insert two geometric means between 110 and 880.  
 (2) Find the cost price of an article which sold at £34, 17s. 8½d. at a gain of 5%.  
 (3) Find the missing term,  $a : 385 :: 0014 : 714285$ .  
 (4) If £15.720 be invested in stock which was sold at 98½, and £480 gained by the transaction, find the cost price.  
 (5) Divide £15,300 among 2 persons so that the one shall receive 70% of the other's share.

## J2.

- (1) If I gain 9d. by selling 12 yards of cloth at 3½d. per yard, what is the gain per cent?  
 (2) Divide 1.75 by .003, and multiply the quotient by .001.  
 (3) I sell a horse for £56 and gain 33½%; what did I pay for the horse?  
 (4) What income will be obtained by investing £1232, 10s. in the 3 per cents at 90%?  
 (5) A cask holds 23 gallons 2 pints; add 25 per cent to this and then take away 20 per cent of the whole. What quantity is left?  
 (6) What principal will amount to £143, 12s. 7½d. in 5 years at 4½%?

## K2.

- (1) A person sells, out of the 3½ per cents, £10,000 stock, realizing £9350. At what price must the 4 per cents be so that the above sum, when invested in them, shall produce an increase of £10 income?  
 (2) A house which cost £895 was sold at a loss of 12½ per cent; find the selling price.  
 (3) In a school .55 of the children were boys, and there were 18 more boys than girls. What was the number of children in the school?  
 (4) A grocer sold 9 lbs. of cheese for what 15 lbs. cost; find the gain per cent.  
 (5) Find the simple interest on £960 for 3 years 219 days at 5%.

(6) Simplify  $\frac{1\frac{1}{2}}{3} + \frac{4\frac{3}{4} - 1\frac{1}{2}}{2\frac{1}{4}} - \frac{2\frac{1}{2}}{5}$ .

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## L2.

- (1) Divide 4 guineas between A and B so that  $\frac{1}{2}$  of A's share shall be equal to  $\frac{2}{3}$  of B's.  
 (2) By selling 12 lbs. of tea at 3s. 6d. per lb. I gain 5 per cent. What do I gain or lose per cent by selling 50 lbs. of the same tea for £6, 9s. 2d.?  
 (3) A person possessing  $\frac{1}{12}$  of an estate, sold  $\frac{2}{3}$  of  $\frac{1}{12}$  of his share for £120, 12s. 6d. What would  $\frac{1}{3}$  of  $\frac{1}{12}$  of the estate sell for at the same rate?

A owned  $\frac{2}{3}$  of a farm of 300 acres; he sold  $\frac{2}{3}$  of his share to B, and B sold  $\frac{1}{4}$  of his share to C. What is the value of C's land at £50 per acre?

10 dozen of eggs are bought at 1s. 3d. per dozen;  $\frac{1}{2}$  of them are sold at 1s. 5d. a doz. and the rest at 2s. per dozen. What is the gain per cent?

The first term of an arithmetical series is 5, and the 15th term is 47. Find the common difference.

### M 2.

Reduce  $\left( \frac{3\frac{1}{3}}{7} + \frac{2}{10\frac{1}{2}} - \frac{5}{18} \text{ of } \frac{4}{7} \right) \times 1\frac{3}{4}$  to its simplest form.

A invests £1000 in the 3 per cents at 84, and B invests £1000 in the 4% at 98. Find the difference in their incomes.

What sum of money will amount to £877, 12s. 6d. in 4 years at  $4\frac{2}{3}\%$  simple interest?

Find the amount of £570, 10s. for 3 years at 4 per cent compound interest.

$\sqrt[3]{43.614208}$ .

Find the discount on £128, 13s. due in  $1\frac{1}{3}$  years hence at 5%.

### N 2.

Find the sum of the series 3, 7, 11.....to 22 terms.

Find by Practice the value of  $8\frac{5}{12}$  cwts. at £22, 3s. 4d. per cwt.

A boy, after spending  $\frac{2}{3}$  of his money, finds that  $\frac{1}{4}$  of what he has left is 1s. 9d. How much money had he at first?

Find in decimals of £1 the difference between the Simple and Compound interest on £256 for 3 years at  $4\frac{1}{2}$  per cent.

A man after paying 7d. in the £1 of income-tax has £248, 10s. 8d. left. What was his gross income?

What amount of  $4\frac{1}{2}\%$  stock at  $92\frac{1}{2}$  can I buy for £5550, and what income should I obtain?

### O 2.

A person has £1360 Consols (3%). If the stock is sold out at  $88\frac{1}{4}$ , and the proceeds invested in Railway stock at  $106\frac{1}{4}$ , paying a dividend of 6%, what will be the increase in income?

A man bought 56 lbs. of coffee at 10d. per lb., and 56 lbs. of chicory for 30s. He sold to gain 5%. What charge did he make for the whole of it?

A farm servant's wages are lowered from £13, 17s. 6d. to £11, 11s. 3d. What is that per cent?

A person gave away  $\frac{1}{5}$  of his money and then  $\frac{2}{3}$  of the remainder, and the rest was £125, 18s.  $3\frac{1}{2}$ d. What had he at first?

What is the rate of interest when the 3% are at 84?

What decimal is 7 lbs. of 3·15 tons?

## P2.

- (1.) A salesman buys 5 boxes of eggs, each containing 216 eggs. If 5 per cent of them were bad, how many sound eggs were there?
- (2.) Subtract 25 per cent of 100 guineas from £75 of £100, and reduce your answer to sixpences.
- (3.) A man walked  $\frac{1}{2}$  the distance he had to go the first day,  $\frac{3}{5}$  of the remainder the second day,  $\frac{3}{4}$  of what still remained the third day, and still had 18 miles to go. What was the whole distance to be travelled?
- (4.) A grocer mixes 3 lbs. of tea at 5s. 8d. per lb., 9 lbs. at 2s. 6d. per lb., 6 lbs. at 4s. 9 $\frac{1}{2}$ d. per lb., 3 $\frac{3}{4}$  lbs. at 5s. per lb. What is the average cost of the mixture?
- (5.) By selling sugar at £25, 13s. 4d. a ton I lost 8 $\frac{1}{2}\%$ ; how much per lb. did it cost me?
- (6.) A and B together can mow a field in 2 days; A alone can do it in 5 days. How long would it take B?

## Q2.

- (1.) Find the amount of £365, 16s. 9d. for 646 days at 5%.
- (2.) A man invested in the 3% Consols at 90; find the rate of interest he obtained.
- (3.) Three men purchase a farm. A pays £130; B, £100; and C, £70. They make a profit the first year of £60. What is the share of each?
- (4.) Find the price of the Three per cent stock when an investment of £434, 12s. 6d. produces an income of £14, 5s.
- (5.) If eggs be bought at the rate of 5 a penny, how many should be sold for 7d. to gain 40%?
- (6.) Find the value of  $\frac{5\frac{1}{2} \div \frac{3}{2}}{(1\frac{1}{2} \text{ of } \frac{8}{3}) \div 10\frac{1}{2}} \times \frac{2}{3} \text{ of } \frac{1\frac{1}{2} \text{ of } 4\frac{1}{2}}{13\frac{1}{2} \text{ of } 5\frac{1}{2}}$ .

## R2.

- (1.) If 15% be deducted from a bill of £5, 2s. 6d., how much is paid?
- (2.) The first term of an increasing equidifferent series is 2, the common difference 3, and the number of terms 17. Find the last term.
- (3.) A person invests £1365 in the 3 per cents at 91; he sells out £1000 stock when they have risen to 93 $\frac{1}{2}$ , and the remainder when they have fallen to 85. How much does he gain or lose by the transaction?
- (4.) A grocer buys treacle at 14s. per cwt. and sells it at 2d. per lb. Find his gain per cent.
- (5.) B walks 5 $\frac{1}{2}$  miles while A walks 4 $\frac{1}{2}$  miles. How long will B take to travel a distance walked by A in 7 $\frac{1}{2}$  hours?
- (6.) Find the discount on £100 for 1 $\frac{1}{2}$  years at 1 $\frac{1}{2}\%$ .

## EXAMINATION PAPERS FOR MONITORS.

## D. FEMALES. 1888. 100 marks.

- (1.) Distinguish between a multiple and the least common multiple; a measure and the greatest common measure; prime numbers and numbers prime to one another. (24 marks.)
- (2.) A bankrupt's estate yielded 7s. 9d. in the £. What was the amount of a creditor's claim who received £216, 2s. 1d. in payment of it? (26 marks.)
- (3.) If  $10\frac{2}{3}$  cwts. cost £5, 12s., what will  $7\frac{2}{3}$  lbs. cost at the same rate? (26 marks.)
- (4.) Multiply 73·8 by ·0058 and divide the product by  $\frac{1}{2}$  of ·00812. (24 marks.)
- (5.) If 2 cwts. 3 qrs. 18 lbs. of tea cost as much as 27 cwts. 2 qrs. 17 lbs. of sugar, what weight of sugar should be given in exchange for 10 lbs. of tea? (18 marks.)
- (6.) In how many years will £150, 10s. amount to £218, 4s. 6d. at  $4\frac{1}{2}\%$ ? (12 marks.)
- (7.) Simplify  $\frac{5\frac{1}{2} + 3\frac{2}{3}}{8\frac{1}{4} - 5\frac{5}{6}}$ . Give the answer as a decimal. (12 marks.)
- (8.) Find by practice the rent of 34 ac. 3 rds. 14 per. at 11s. 5d. per rood. (18 marks.)

D. FEMALES. 1889. 100 marks. ( $2\frac{1}{2}$  hours.)

- (1.) If 49 men can do a piece of work in 130 days of 8 hours each, how many hours a day must 196 men work to do as much in 26 days? (20 marks.)
- (2.) If ·0625 of a lb. cost ·458s., what will ·975 of a ton cost? (28 marks.)
- (3.) Prove that there are 640 acres in a sq. mile. (25 marks.)
- (4.) A lady after paying an income-tax of 5d. in the £1 has a net income of £982, 2s. 1d. Find her original salary. (27 marks.)
- (5.) What quantity of beef at 8s. 2d. a stone ought to be given in exchange for a chest of tea containing 84 lbs. at 3s.  $2\frac{1}{2}$ d. per lb.? (12 marks.)
- (6.) Find the dividend on £2734, 16s. 8d. at 9s.  $4\frac{1}{2}$ d. in the £1. (12 marks.)
- (7.) Divide the product of  $4\frac{4}{5}$  and  $2\frac{2}{5}$  by the difference between  $5\frac{1}{2}$  and  $4\frac{1}{2}$ . (13 marks.)
- (8.) What principal will produce £36, 12s. 6d. in  $2\frac{1}{2}$  years at  $3\frac{1}{2}$  per cent per annum? (13 marks.)

D. FEMALES. 1890. 100 marks. ( $2\frac{1}{2}$  hours.)

- (1.) Add together  $\frac{3}{4}$  of a sq. mile,  $\frac{2}{3}$  of an acre, and 98 sq. yards, giving the answer in sq. feet. (28 marks.)
- (2.) I bought 4 cwt.s. of sugar at 4d. per lb., and 7 cwt.s. at 5d. per lb. At how much per lb. must I sell the mixture to gain 20 per cent? (24 marks.)
- (3.) Find the missing term in the proportion  $\frac{2}{3} : ? :: \frac{1}{4} : 1\frac{1}{2}$ . (24 marks.)
- (4.) If 10 horses consume 7 bushels 2 pecks of oats in 7 days, in what time will 28 horses consume 3 quarters 6 bushels at the same rate? (24 marks.)
- (5.) Simplify  $\frac{\frac{3}{4} + \frac{2}{3} - \frac{5}{6}}{\frac{1}{4} + \frac{2}{7} + \frac{3}{16}} + (\frac{1}{4} \times 2\frac{1}{2})$ . (14 marks.)
- (6.) Find the value of 3 lbs. 2 ozs. 10 dwts. 12 grs. of gold at £2,18s. 10 $\frac{1}{2}$ d. per oz. (12 marks.)
- (7.) If 120 men build a wall 18 feet high in 6 days, how many men will build a wall 12 feet high in 15 days? (12 marks.)
- (8.) At what rate per cent simple interest will £265, 4s. amount to £298, 7s. in 4 years? (12 marks.)

## D. FEMALES. 1891. 100 marks. (2 hours.)

- (1.) Define the terms, measure, common measure, and greatest common measure; and find the greatest common measure of 805, 2622, and 1978. (25 marks.)
- (2.) If  $42\frac{1}{2}$  yards of cloth, which is 18 inches wide, cost £59, 14s. 2d., what will  $118\frac{1}{2}$  yards of yard-wide cloth of the same quality cost? (25 marks.)
- (3.) What is Present worth? Find the present worth of £149, 1s. 3d., due 7 years hence at  $2\frac{1}{4}$  per cent simple interest. (25 marks.)
- (4.) A man engages to ride 500 miles in 60 hours. He rides 2 miles in  $11\frac{1}{4}$  mins., and stops an hour at the end of every 40 miles. How much time has he to spare? (25 marks.)
- (5.) How much per cent is  $2\frac{1}{2}$ d. in a shilling? (13 marks.)
- (6.) By selling cloth at 7s. 8d. per yard there was a loss of 8 per cent. What price per yard should the cloth be sold at so as to gain 8 per cent? (13 marks.)
- (7.) Divide .00176 by 42.73. (12 marks.)
- (8.) Reduce 2 furlongs 11 yards 1 foot 9 inches to the decimal of a statute mile. (12 marks.)

D. FEMALES. 1893. 100 marks. ( $2\frac{1}{2}$  hours.)

- (1.) Find by Practice the cost of a bar weighing 4 lbs. 5 ozs. 5 dwts. 21 grs. at £3, 17s. 10 $\frac{1}{2}$ d. per oz. (25 marks.)
- (2.) (a) If a pound of sugar costs .0703125 of 16s., find the value of .0625 cwt.  
(b) Divide the product of 2.146 and .0138 by .023. (25 marks.)

- (3.) (a) Reduce eight millions eight hundred and sixty-eight thousand and ninety-seven square feet to acres, statute measure.  
 (b) Reduce  $9\frac{3}{4}$  acres statute measure to Irish measure. (25 marks.)
- (4.) A sum of money amounting to £32,818 is divided among four men in the proportion of the fractions  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{1}{6}$ . How much did each man receive? (25 marks.)
- (5.) (a) Show that an exercise in subtraction may be proved in two ways.  
 (b) In a certain sum the divisor is 31884740, the quotient 40930. Find the dividend. (13 marks.)
- (6.) If  $4\frac{1}{2}$  lbs. cost £3 $1\frac{1}{2}$  what will  $2\frac{1}{2}$  cwt. cost? (13 marks.)
- (7.) Find the interest on £706, 15s. 11d. from the 12th June to 16th November at 7 per cent. (12 marks.)
- (8.) Add together  $\frac{1}{6}$  of a guinea,  $\frac{1}{10}$  of a pound,  $\frac{7}{10}$  of a shilling, and reduce the result to the decimal of a crown. (12 marks.)

D. MALES. 1888. 100 marks. (2 hours.)

- (1.) Show by an example that the simple interest on a given sum for a number of days at a given rate per cent can always be found by a statement in compound proportion. Explain fully. (25 marks.)
- (2.) A Troy lb. of standard gold is coined into  $46\frac{2}{3}$  sovereigns; what is the weight of a sovereign in grains? (25 marks.)
- (3.) Find the square root to three places of decimals of  $1 \div 0041$ . (25 marks.)
- (4.) Find the value in acres, roods, perches, &c., of—  

$$\frac{3}{2} \text{ of } \frac{3 \cdot 6}{0 \cdot 24} \text{ of } \frac{1}{120} \text{ of an acre.} \quad (25 \text{ marks.})$$
- (5.) What vulgar fraction is equivalent to the sum of 1·45 and 1·175 divided by  $2\frac{1}{2}$ ? (12 marks.)
- (6.) What is the true discount on a six months' bill for £1239 drawn on 16th March but paid on 8th May, allowing 5 per cent per annum? (12 marks.)
- (7.) Find the value of  $\frac{\frac{6}{5} \text{ of } 3\frac{1}{2}}{2\frac{1}{2} - \frac{2}{3}}$  of a stone weight. (12 marks.)
- (8.) If 4·275 tons cost £3, 14s. 9 $\frac{3}{4}$ d., find the price per cwt. (14 marks.)

D. MALES. 1889. 100 marks. (2½ hours.)

- (1.) Explain and prove the rule for reducing Irish square measure to statute measure. (25 marks.)
- (2.) Twelve men undertook to do a piece of work in 14 days; some of them, however, having failed to attend, the work occupied 24 days; how many men remained away? (25 marks.)
- (3.) Find the simple value of  $\frac{5\frac{2}{3} \div 7\frac{2}{3}}{2\frac{1}{3} - 1\frac{2}{7}}$  of  $\frac{2\frac{1}{2} \times 8\frac{1}{2}}{4\frac{1}{2} \div (\frac{1}{3} - \frac{1}{6})}$  (25 marks.)

- (4.) Subtract  $\frac{1}{12}$  of  $\frac{1}{2}$  of a guinea from  $\frac{2}{3}$  of  $\frac{7}{18}$  of £1, and express the difference as a decimal of half-a-crown. (25 marks.)
- (5.) Find the 3rd term of a proportion of which the 1st, 2nd, and 4th terms are respectively  $11\frac{1}{2}$ , .065 and 4.7. (15 marks.)
- (6.) If a railway company charge 9s.  $4\frac{1}{2}$ d. for carrying 1.875 tons for 60 miles, how far ought it to carry  $13\frac{1}{2}$  tons for 27s.? (15 marks.)
- (7.) Into how many plots, each containing  $137\frac{1}{2}$  square yards, could a five acre field be divided? (10 marks.)
- (8.) Make each of these numbers 10,000 times larger: .8; .000285; 63. (10 marks.)

D. MALES. 1890. 100 marks. (2 hours.)

- (1.) If 5 men and 3 boys can perform a work in 35 days of 12 hours each; in how many days of 10 hours each can 16 men perform the same work, the work of 3 men being equal to that of 7 boys? (28 marks.)
- (2.) Find the missing term in the proportion  $5.2 : 7 :: ? : 4\frac{1}{5}\frac{2}{4}$ . (24 marks.)
- (3.) If the carriage of 6 cwts. 3 qrs. for 124 statute miles cost £3, 4s. 8d., what weight should be carried 94 Irish miles for £1, 4s. 3d.? (24 marks.)
- (4.) If  $5\frac{1}{2}$  per cent be gained by selling butter at £5, 5s. 6d. per cwt. how much per cent will be gained by selling it at 1s. 3d. a lb.? (24 marks.)
- (5.) How many trees can be planted in a field of three acres and 20 perches, if each tree occupies a square whose side is five feet? (14 marks.)
- (6.) Find the least common multiple of 5, 6, 7, 8, 9. (10 marks.)
- (7.) Find by Practice the assets of a bankrupt who can pay 7s.  $9\frac{1}{2}$ d. in the pound on a debt of £186, 10s. 10d. (12 marks.)
- (8.) What fraction of  $\frac{1}{2}$  of a mile is  $3\frac{7}{8}$  of  $\frac{5}{3\frac{3}{4}}$  of a fathom? (14 marks.)

D. MALES. 1891. 100 marks. (2 hours.)

- (1.) If a sheep is worth £1, 5s.  $3\frac{1}{2}$ d., how many can I buy for £102, 10s.  $3\frac{1}{2}$ d.? If I lose four, and sell the rest at 13 half-crowns a head, what do I gain or lose? (25 marks.)
- (2.) Divide the square root of  $1.002001$  by 2.002. (25 marks.)
- (3.) A bill due 3 months hence is discounted at 4 per cent by the ordinary method, and its present value is £1225; what is the amount of the bill? (25 marks.)
- (4.) A person bought 100 oranges at 16 for 1s. just before a rise in price of  $1\frac{1}{2}$ d. a dozen; how much did he save by buying before the rise? (25 marks.)
- (5.) Divide the sum of  $3\frac{1}{2}$ ,  $\frac{2}{7}$ ,  $\frac{4}{11}$ , and  $11\frac{1}{2}$  by half the difference between  $\frac{3}{7}$  and  $4\frac{1}{2}$ . (13 marks.)

- (6.) If a person walking 13 hours each day travels 191 miles in 7 days, in how many days of 9 hours each will he complete a journey of 450 miles at the same rate each hour? (13 marks.)

(7.) If .325 of a sum of money be £14, find the sum. (12 marks.)

(8.) If  $\frac{1}{8}$  cwt. cost £7, 3s., what will  $\frac{9}{10}$  of a ton cost? (12 marks.)

D. MALES. 1892. 100 marks. (2½ hours.)

Only 4 questions to be attempted.

- (1.) A bankrupt pays 1s. 11d. in £1; how much is lost by a creditor who sold him 8 cwts. 2 qrs. 8 lbs. at £1, 4s. 4½d. per cwt.? (25 marks.)

- (2.) A colliery employs 120 men for 8 hours a day for 5 days of the week; how many men, working 6 hours a day for 4 days of the week, should it employ, if only half the coal is to be raised? (25 marks.)

- (3.) Add together  $\frac{4}{5}$  of  $\frac{1}{4}$  of £1 and  $\frac{3}{8}5714\frac{1}{2}$  of a guinea, and express the result as a decimal of £2. (25 marks.)

- (4.) If 7 cwts. 2 qrs. 15 lbs. cost £25, 19s. 10d., what must it be sold at per lb. to gain 15 per cent? (25 marks.)

- (5.) How many yards of carpet 2 ft. 9 in. wide will cover a room 18 feet long and 19 feet wide? (12 marks.)

- (6.) Explain terms: *integer, continual, product, multiple, improper fraction.* (12 marks.)

- (7.) At what rate per cent simple interest will £225 become £267, 3s. 9d. in  $7\frac{1}{2}$  years? (13 marks.)

- (8.) Multiply the square root of  $2\frac{4}{9}$  by  $29\frac{5}{6}$ . (13 marks.)

C. FEMALES. 1890. 100 marks. (2 hours.)

- (1.) A grocer buys 3 cwts. of sugar at 5d. per lb., and 7 cwts. at  $6\frac{1}{2}$ d. per lb. He sells  $5\frac{1}{2}$  cwts. at  $5\frac{1}{2}$ d. per lb. At what rate per lb. must he sell the remainder in order to make 50 per cent on his whole outlay? (20 marks.)

- (2.) Find the exact value of  $\frac{7}{15}$  of  $162\frac{5}{57}14\frac{1}{2}$ . (20 marks.)

- (3.) Ten men by working  $10\frac{1}{2}$  hours a day can complete a certain work in 9 days, but if three of them can work only 6 hours each day, how many hours a day must the others give in order that the work may be finished in 10 days? (20 marks.)

- (4.) A sum of £60 is divided between A and B. A gets  $\frac{7}{12}$  of it and B  $\frac{5}{6}$  of the remainder, and the rest is then equally divided between them. How much has one more than the other, and what fraction has each of the whole? (20 marks.)

- (5.) A person transfers £5000 from the 3½ per cents at 98 to the 3 per cents at 94; how much of the latter stock will he hold, and what will be the difference in his income? (20 marks.)

- (a.) Find the value of  $\frac{3}{4}$  of a crown +  $\frac{7}{8}$  of a pound +  $\frac{2}{3}$  of a guinea  
Reduce the result to the decimal of £5. (10 marks.)
- (b.) (a) What class of questions in Proportion may be solved by Practice?  
(b) Give the special multipliers used in Practice for tons, cwt., qrs., and for ozs., dwts., grs.; and explain. (10 marks.)
- (c.) What is meant by ratio? Which is greater, the ratio of 6 to 7 or of 9 to 11? Explain fully. (10 marks.)
- (d.) Find a sum that shall be the same part of £14, 7s. 9 $\frac{1}{2}$ d. that 4 oz. 7 dwts. 5 grs. is of 8 oz. 10 dwts. 15 grs. (10 marks.)
- (e.) If 100 lbs. of tea be bought at 2s. 2d. per lb. and sold at 2s. 6d. and 100 lbs. of sugar be bought at 4 $\frac{1}{4}$ d. a lb. and sold at 5 $\frac{1}{4}$ d., what profit per cent will be realized on the outlay? (10 marks.)

## C. FEMALES. 1891. 100 marks. (2½ hours.)

- (f.) The difference between two numbers when multiplied by  $\frac{3}{8}$  becomes 171, the smaller is 5: find the other. (20 marks.)
- (g.) When the price of gold is 4 guineas an ounce what is the cost of a gold ornament weighing 3 ozs. of which 18 parts out of 24 are pure gold; allowing 3s. 4d. an ounce for the alloy, and  $\frac{1}{2}$  of the whole cost for workmanship? (20 marks.)
- (h.) If oranges are bought at the rate of 20 for a shilling, how many should be sold for £1, 8s. to gain 40 per cent? (20 marks.)
- (i.) A can run a mile in 7·68 minutes, B can run at the rate of 7·88 miles in an hour, which is the faster runner? And in a race which the faster wins in 6 minutes, how far will the loser be behind? (20 marks.)
- (j.) Explain the reason of the following rule:—To find the interest of a given sum for any number of days—multiply the principal by twice the rate, and this product by the days, and divide by 73,000. (20 marks.)
- (k.) Simplify the expression—

$$\frac{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}}{\frac{1}{2\frac{1}{2}} + \frac{1}{3\frac{1}{2}} + \frac{1}{4\frac{1}{4}}}.$$
(10 marks.)

- (l.) A owns 567 of an estate and B the remainder. Express B's share as a vulgar fraction; and find its value if the whole estate be worth £13,500. (10 marks.)
- (m.) If £35, 5s. is paid in two years as income-tax on an annual income of £846, at what rate per cent is the tax levied? (10 marks.)
- (n.) A metre is 39·3708 inches. Reduce 14 yards 3 quarters 2 miles to metres. (10 marks.)
- (o.) Mention three cases in which the rule for proving multiplications by casting out the nines would fail to detect the mistake. (10 marks.)

C. FEMALES. 1892. 100 marks. ( $2\frac{1}{2}$  hours.)

Only 5 questions to be attempted.

- (1.) When the income-tax is 5d. in the £, a man pays £6, 10s. per annum as income-tax and lives on 75 per cent of his income; how much does he put by yearly? (20 marks.)
- (2.) State accurately the rule for multiplication of decimals, and give the reason of the rule. (20 marks.)
- (3.) If 18 men working 9 hours a day can dig a trench 100 feet long, 12 feet wide, and 8 feet deep in 21 days, how many days of 10 hours must 24 men work to dig a trench 120 feet long, 8 feet wide, and 9 feet deep? (20 marks.)
- (4.) Find the value of  $\frac{87 + 796}{87 - 796}$ . (20 marks.)
- (5.) £3000,  $3\frac{1}{2}$  per cent stock, is sold at 90, and £4000, 4 per cent stock, is sold at 95, and the proceeds invested in  $4\frac{1}{2}$  per cent stock at  $92\frac{1}{2}$ ; what difference is there in income? (20 marks.)
- (6.) In every 55 yards that he ran, A gained 5 feet upon B and won by 53 yards 1 foot; what was the length of the course? (10 marks.)
- (7.) Reduce 90,101 square feet to acres, &c., and find rent to nearest farthing at 1s. 6d. a square perch. (10 marks.)
- (8.) The remainder after a division is 97; the quotient is 665; and the divisor is 91 more than the sum of both; what is the dividend? (10 marks.)
- (9.) If £1 = 24·6 francs; find the value of £326, 6s. 8d. in francs. (10 marks.)
- (10.) Find the missing term in the proportion:—  
 $? : 2s. 6d. :: 4a. 1r. 10p. : 10a. 3r. 5p.$  (10 marks.)

C. FEMALES. 1893. 100 marks. ( $2\frac{1}{2}$  hours.)

Only five questions to be attempted.

- (1.) (a) "In stating a sum in Simple Proportion, the first and second terms must be of the *same kind*." Why?  
 (b) The rent of a farm containing 17 acres 1 rood 15 perches Irish measure is £25, 14s. 6d. Find the rent at the same rate of a farm containing 34 acres 2 roods 30 perches statute measure. (20 marks.)
- (2.) By mixing two kinds of tea which cost 2s. 4d. and 1s. 8d. per lb. respectively, and selling the mixture at 2s.  $3\frac{1}{2}$ d. per lb., there is a gain of 25 per cent: how much of the inferior quality should go to 10 lbs. of the superior? (20 marks.)
- (3.) (a) Give two rules for multiplying and two rules for dividing a fraction by an integer.  
 (b) Simplify  $\frac{\frac{2}{3} \text{ of } \frac{3}{5} \text{ of } \frac{5}{6}}{4\frac{1}{2} + \frac{1}{3} - 1\frac{1}{2}}$ . (20 marks.)

- (7.) A bought a horse which he sold to B at a profit of 5 per cent; B sold it to C and gained  $16\frac{2}{3}$  per cent on his outlay; C gave 140 guineas for the horse. What did A give for it? (10 marks.)
- (8.) What sum of money will amount to £552, 14s. 3d. in 3 years at 2 per cent, compound interest? (10 marks.)
- (9.) Express 43 days 19 hours 12 minutes as the decimal of a year. (10 marks.)
- (10.) A kitchen 14 feet  $\times$  16 feet is to be covered with tiles 6 inches square; what will the tiles cost at 3s. 8*1*d. a dozen? (10 marks.)

C. MALES. 1893. 100 marks. ( $2\frac{1}{2}$  hours.)

Only 5 questions to be attempted.

- (1.) By selling out 3 per cent consols at  $102\frac{2}{3}$ , and investing the proceeds in a railway stock which pays 7 per cent per annum, a man finds that his income is doubled. What is the price of the railway stock? (20 marks.)
- (2.) The multiplicand is  $6\cdot752$  of  $3\cdot53$  and the product is  $47\frac{11}{12}\frac{1}{2}$ . Find the multiplier. (20 marks.)
- (3.) A room is 24 ft. 9 in. long and 20 ft. wide. The cost of papering it with paper 2 ft. wide at 4d. per yard is £2, 19s. 8d. Find the height of the room. (20 marks.)
- (4.) In what proportion must tea which cost 4s. 6d. per lb. be mixed with tea at 2s. 11d., so that by selling the mixture at 3s. 8d. per lb. 20 per cent may be gained. (20 marks.)
- (5.) Write out and explain fully the rule for multiplication when both multiplicand and multiplier are over twelve, and the multiplier is not a composite number. (20 marks.)
- (6.) Add together '0021 cwt., '045 qr., '37 lb., and subtract the sum from 35.263 ounces. Express the answer in ounces and the decimal of an ounce. (10 marks.)
- (7.) A dealer marks his goods with two prices, one for ready money and the other for one year's credit to bear interest at 5 per cent on present price. If the credit price is £3, 10s., find the price for present payment. (10 marks.)
- (8.) Find the weight of air in a room  $47\frac{1}{2}$  feet long,  $21\frac{1}{2}$  feet broad, and  $10\frac{2}{3}$  feet high, the weight of one cubic foot of air being  $1\frac{1}{4}$  oz. (10 marks.)
- (9.) Show that 15 and 22 are *prime* to each other although they are not *prime* numbers. When numbers are *prime* to each other how do you find their least common multiple? (10 marks.)
- (10.) (a) Find to three places of decimals the square root of 8.027. (10 marks.)  
 (b) Express the product of 4.625 and .027 as a fraction in its lowest terms. (10 marks.)

## INTERMEDIATE EXAMINATIONS.

## JUNIOR GRADE.

1889.

- (1.) Divide the product of one million ten thousand and one, and five thousand and fifty by the difference between one million one hundred thousand and one, and twenty thousand and ten.
- (2.) Reduce 1,073,916 square inches to statute perches, yards, &c.
- (3.) The railway fares from Dublin to Belfast are £1, 2s. 9d. first class, 15s. 7d. second class, and 9s. 5d. third class. If a family of 9 persons travel by first class, with 3 servants who ride in second class, how much are the expenses higher than they would have been if the family had gone in second class and the servants in third?
- (4.) A railway train travels at the rate of  $52\frac{1}{2}$  miles in  $1\frac{3}{4}$  hours. It leaves Cork, according to a clock which is 8 minutes slow, at 10:45 a.m., and arrives the same day in Dublin, according to a clock which is 17 minutes slow, at 5:32 p.m. Find the distance between Cork and Dublin.
- (5.) Gold is £3, 17s. 6d. per ounce, silver is £2, 14s. per lb. What is the value of a piece of silver of equal weight with a piece of gold which is value for £1085?
- (6.) A mason can build 3 yards of a wall in 15 hours; how long will it take 6 masons working at one and a half times the rate to build 24 yards of a wall which is one-third higher than the other?
- (7.) An investor secures an annual income of £75, 10s. from a capital of £3000, after paying eightpence in the £1 for income-tax. What sum must be invested in the same securities to yield an annual income of £95, 10s. after paying sixpence in the £1 income-tax?
- (8.) What part of  $\frac{2}{3}$  of  $7\frac{1}{2}$ d. is  $\frac{1}{2}$  of 1s.  $2\frac{1}{2}$ d.?
- (9.) Simplify  $\frac{\frac{2}{3} \text{ of } 3\frac{1}{2} - \frac{1}{2} \div 1\frac{1}{2}}{\frac{1}{2} + \frac{2}{3} - (\frac{4}{5} + \frac{1}{3})}$ .
- (10.) Divide the continued product of '1, '2, and '3 by their sum.
- (11.) By how much does the difference between 9·8 and 2·79 exceed the sum of 1·4 and 2·6?
- (12.) Find by Practice the cost of repairing a road 3 miles 4 furlongs  $5\frac{1}{2}$  poles long at £10, 12s. 8d. per mile.
- (13.) Find the interest on £367, 6s. for  $2\frac{3}{4}$  years at  $4\frac{2}{3}$  per cent.
- (14.) On the 10th June an invested sum of £580 at  $\frac{5}{6}$  per cent per annum had amounted to £585, 16s.; on what day was it invested?

— 17 —  
MATERIAL AT THIS STATION  
WILL BE USED.

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## 1891.

- Divide the sum of 502,701, 30,250, and 1385 by the difference between 29,035 and 30,507. Multiply the quotient by 10,203, and express the product in words.
- Reduce 154,235,648 sq. in. to acres, rods, perches, &c.
- I buy a certain number of ripe apples at the rate of four for 3d., and an equal number of unripe ones at the rate of three for 2d. Having mixed them all together, how many must I sell for £1, 5s. 6d. so as neither to gain nor lose by the transaction?
- A draper bought 720 yards of cloth at 17s. 6d. per yard; 60 yards are destroyed, and 120 yards, partly damaged, have to be sold at 10s. 6d. per yard. At what price per yard must the remainder be sold in order to gain 2s. 6d. per yard on the whole transaction?
- If 20 men consume £11, 12s. 6d. worth of provisions in 8 days, how long would £46, 10s. worth of provisions last 32 men at the same rate?
- A bankrupt, whose assets are £540, finds that, by paying 14s. in the £ on  $\frac{3}{4}$  of his debts, he can only pay 6s. in the £ on the remainder. What is the total amount of his debts?
- If 10 masons, working 8 hours per day and 5 days per week, build in 9 months a wall 80 yards long, 20 feet high, and 48 inches wide, how many months would 12 masons, working 6 hours per day and 3 days per week, take to build a wall 60 yards long, 12 yards high, and 1 yard wide?

$$\text{Simplify } \frac{\frac{3}{4} \div 2\frac{1}{2} - \frac{1}{2} \div \frac{3}{4}}{1 + \frac{2\frac{1}{2}}{3\frac{3}{4}} \text{ of } 6} + \frac{1}{2 - \frac{3}{4 - \frac{3}{5}}} - \frac{39}{60}.$$

- A gives away  $\frac{2}{3}$  of a guinea; he gives  $\frac{1}{2}$  of this to B,  $\frac{2}{3}$  of it to C, and the remainder to D. How much did each get?
- What are the respective meanings of the symbols  $\frac{3}{5}$ , 4, and .4? By how much does .4 of £1 differ from £4?
- Add together .231 of £1, 7s. 9d., .023 of £1, 5s., and .02 of 8s. 4d., and reduce the result to the decimal of 14s. 4d.
- Find, by Practice, the cost of 3 tons, 13 cwts. 2 qrs. 18 lbs. of oats at £4, 15s. 8d. per cwt.
- Calculate the simple interest on £840, 8s. 4d. from 2nd May till 14th July at £3, 12s. 6d. per cent per annum.
- In what time would £189, 7s. 6d. amount to £221, 11s. 4½d. at 4 per cent per annum simple interest?

## 1892.

- A vintner expended £74, 18s. 6d. in the purchase of spirits, which cost him 13s. 6d. per gallon. He sold it at 16s. 9d. per gallon, making a profit of £16, 1s. 9d. How many gallons must he have lost by leakage or otherwise?

- (2.) A watch, which loses 5 minutes in 24 hours, is set right at noon on Monday. What is the correct time when it indicates  $50\frac{1}{4}$  minutes past 6 P.M. on the following Friday?
- (3.) Subtract 1 furlong 2 perches 5 yards 2 feet 6 inches from 3 furlongs 2 perches 1 foot, and calculate the cost of the difference at £2, 11s.  $10\frac{1}{2}$ d. per perch.
- (4.) Find the cost of papering a room 22 feet 7 inches long by 17 ft. 5 inches broad and 12 feet high, with paper, of which a piece 5 yards long and 2 feet wide cost 3s.  $5\frac{1}{2}$ d.
- (5.) If 30 men working 6 hours daily reap 60 acres in 16 days, how many acres will 40 boys reap in  $22\frac{1}{2}$  days, working 5 hours daily? 2 men are equal to 5 boys.
- (6.) A man spent  $\frac{2}{5}$  of his money, then  $\frac{1}{3}$  of what he had remaining; after this he had £12 left. How many pounds had he at first?
- (7.) Simplify 
$$\frac{1}{\frac{1}{2} + \frac{1}{3} + \frac{\frac{1}{2} + \frac{1}{3}}{\frac{2}{3} - \frac{1}{2}}} + \frac{1}{\frac{1}{2} + \frac{2}{3} + \frac{1}{4}}$$
.
- (8.) Add together  $0\cdot347 + 0\cdot254 + 0\cdot4832 + 0\cdot7245$ . Give the sum in decimal form.
- (9.) Find, by Practice, the price of 1217 acres 3 roods 30 perches, at £1, 18s. per acre.
- (10.) Find, by Practice, the cost of 1 stone 3 lbs. 10 ozs. 9 drms. at £3, 7s. 8d. per lb. Give the true fraction of a penny in your answer.
- (11.) At what rate per cent simple interest would £755 amount to £845, 12s. in 3 years?
- (12.) How many inches are there in the side of a square containing one perch?
- (13.) Find the square root of 29721.76.
- (14.) A cubical room contains 357,911 cubic feet; find how many square inches there are in the floor.

### 1893.

- (1.) Divide 5 ac. 1 rd. 15 per. 18 sq. yds. 7 sq. ft. 42 sq. in. by 3, and reduce the quotient to sq. in.
- (2.) A merchant bought 60 lbs. of tea at 3s. 4d. per lb., 80 lbs. at 2s. 9d. per lb., and 60 lbs. at 1s. 4d. per lb.; he mixed all together, and sold them at such a price that when 40 lbs. still remained unsold he found that he had gained one-fifth of his original outlay. At what price per lb. did he sell the mixture?
- (3.) A suit of clothes cost £8, 17s. 4d., the trousers cost 3 times as much as the vest, and the coat  $2\frac{1}{2}$  times as much as the trousers and vest together. Find the price of each.
- (4.) I walk from A to B at the rate of 3 miles per hour and return immediately by car at the rate of 7 miles per hour. If the double journey occupy exactly 8 hours, what is the distance from A to B?

- (5.) A can do a piece of work in 12 days, B and C in 8 days, A and C in 9 days. How long would B alone take to do the piece of work?
- (6.) Simplify  $\frac{\frac{2}{3} \text{ of } 3\frac{5}{9} - \frac{4}{5}}{3\frac{1}{2} \div 1\frac{5}{6} - \frac{1}{3}} + \frac{10}{5 - \frac{3}{4 - \frac{2}{3}}}.$
- (7.) In a library  $\frac{5}{14}$  of the books are classical,  $\frac{7}{13}$  of the remainder are mathematical,  $\frac{8}{11}$  of what then remain are scientific, all other kinds number 330. Find the total number of books in the library.
- (8.) Divide 548226 by 68·7; and find as a decimal the difference between 357·2 and 235·1.
- (9.) Find, by Practice, the value of 218 tons, 4 cwts. 3 qrs. 21 lbs. of merchandise at £2, 8s. 9d. per ton.
- (10.) What is the interest on £317, 18s. 9d. from the 2nd of April to the 19th January following at 4 per cent per annum?
- (11.) What principal, bearing interest at  $3\frac{1}{2}$  per cent per annum, will produce £214, 5s. half-yearly?
- (12.) Extract the square root of 94273·5616.
- (13.) The length of a room is twice that of the height or of the width and contains 56745·25 cubic feet of air: find its length.
- (14.) Extract the cube root of 8921261·224.
- 

## MIDDLE GRADE.

1889.

- (1.) What fraction is that from which, if  $\frac{6\frac{1}{4} - 2\frac{3}{4}}{1\frac{1}{5}}$  be subtracted, and the remainder divided by  $\frac{9\frac{1}{8}}{29\frac{1}{6}}$ , the result will be  $\frac{1}{3}$ ?
- (2.) In measuring a hedge, a line 5·4975 yards in length is used and considered a statute pole. Find the length of the hedge when an error of 1 statute pole is made in its measurement.
- (3.) Find, by Practice, the net cost of an iron gate weighing 8 cwts. 2 qrs. 14 lbs. at £3, 14s. 6d. per cwt., after allowing 18s. 8d. per cwt. for the old gate, which weighs 6 cwts. 1 qr. 15 lbs.
- (4.) If £568, 15s. be the cost of 5 boarders at a school for  $3\frac{1}{2}$  years, how many day pupils can be kept for 4 years 8 months for the sum of £980, assuming that the fee of a boarder is to that of a day pupil as £3, 5s. is to £1, 15s.?
- (5.) In how many years would £1500 invested at  $2\frac{1}{2}$  per cent simple interest, produce a sum sufficient to yield an annual income of £15 when invested at 2 per cent?
- (6.) Find within one-ten-thousandth the square root of 37·75, and write down the difference between the square of the root obtained and this number.

- (7.) The carpeting of a room whose length is three times its breadth cost £4, 18s. 7d. Find the length of the room, the carpet being bought at 1s. 9d. per square yard.
- (8.) Extract the cube root of 29993·266043.
- (9.) In what time will £225 amount to £252, 3s. 11 $\frac{1}{4}$ d. at 5 per cent per annum, compound interest?
- (10.) If 7 per cent more be gained by selling a house for £146, 18s. 4d. than by selling it for £137, 6s. 8d., find the original cost.
- (11.) A man transfers his money from the 4 per cents at 102 to the 3 per cents at 95; find the change per cent in his income.
- (12.) Find the price of the 3 per cents when a person receives  $3\frac{1}{2}$  per cent for his money after paying 5d. in the pound income-tax.
- (13.) Find the true discount on £150, 10s. due in 70 days at 5 per cent per annum.
- (14.) If the difference between the true and false discount on a sum of money for 3 months at 4 per cent simple interest is 3s. 4 $\frac{1}{2}$ d., find the sum.

## 1890.

- (1.) Simplify  $\frac{\frac{1}{2} \text{ of } 2\frac{1}{2} + \frac{3}{4} \div \frac{9}{10}}{\frac{3}{2} - \frac{2}{3} \text{ of } (\frac{1}{2} + \frac{1}{3}) + \frac{1}{2}\frac{1}{2}} \times (\frac{1}{2} + \frac{1}{3})$ .
- (2.) Add together 2·137, 3·823, and 1·29; and from the sum subtract 5·12572, giving results as circulating decimals.
- (3.) If 3 tons of hay would support 5 horses or 7 cows for 72 days, for how many days would 1 ton of corn support 1 horse and 1 cow, there being as much support in 15 tons of corn as in 28 tons of hay?
- (4.) A draper invests his capital in cloth at 6s. 6d. per yard; he sells 40 yards, which are damaged, at 3s. 4d. per yard, and the remainder at 12s. 6d. per yard, and gains two-thirds of his original outlay on the transaction. How many yards of cloth did he buy?
- (5.) A banker in mistake calculates the simple interest on a certain principal for  $4\frac{1}{2}$  years at  $3\frac{1}{2}$  per cent instead of calculating it for  $4\frac{1}{3}$  years at  $3\frac{1}{3}$  per cent, and thereby charges £1, 1s. 1 $\frac{1}{4}$ d. too much. Find the correct amount of the principal and also of interest.
- (6.) Calculate the cost of inclosing a square bowling-green, containing 4 acres 26 perches  $17\frac{1}{2}$  yards, with wire fence at half-a-crown per yard.
- (7.) Extract the square root of 3 and also the square root of 3, in each case to three decimal places, and multiply together the results.
- (8.) Find the cube root of 135400835·375.
- (9.) If £500 invested for two years at compound interest amount to £540, 16s., find the cent.

- (10.) I bought a certain quantity of goods at £6, 5s. per cwt. and sold the half of them at a loss of 4 per cent; at what price per cwt. must I sell the other half so as to gain 8 per cent on the whole?
- (11.) A 4 months' bill drawn on the 1st of February and discounted on the 23rd of March at 5 per cent realized £742, 10s.; find the amount of the bill (ordinary discount).
- (12.) The ordinary discount on a bill having 2 months to run exceeds the true discount by 10s., rate 6 per cent per annum. Find the true discount.
- (13.) A man invests £668, 10s. in the 3 per cents at 95 $\frac{1}{2}$ ; he sells out when they have risen to 97 $\frac{1}{2}$ , and invests the proceeds in 4 per cents at 104 $\frac{1}{2}$ ; find the change in his income. Allow for brokerage  $\frac{1}{2}$  per cent in each transaction.
- (14.) What rate per cent does a man get for his money by investing in £10 bank shares selling at 25, and paying 10 per cent?

## 1891.

- (1.) Reduce to its simplest form the expression—

$$\frac{13}{45} \text{ of } \left[ 1 - \frac{\frac{3}{5}}{5 - \frac{3}{8 - \frac{3}{7}}} \right] + \frac{\frac{2}{3} \div (1 - \frac{1}{2}) + \frac{1}{3} + \frac{1}{7}}{1 - \frac{1}{7} \text{ of } \left( \frac{\frac{2}{3}}{1 - \frac{1}{2}} + \frac{1}{3} \right)} - \frac{2}{3}.$$

- (2.) Find the value of  $\frac{4}{5}$  of .15 of £1 +  $\frac{2}{3}$  of .539 of £1, 0s. 7 $\frac{1}{2}$ d. -  $\frac{1}{3}\frac{1}{7}$  of  $\frac{1}{2}\frac{1}{5}$  of 18 $\frac{3}{4}$ d.
- (3.) Find at what times between 7 and 8 o'clock are the hands of a watch equidistant from the figure VII of the dial, (1) on the same side, (2) on the opposite sides of it.
- (4.) I buy a certain number of apples at the rate of 39 for 6d., and an equal number at the rate of 41 for 6d., and retail the lot at the rate of 20 for 3d. Do I gain or lose by the transaction? And if so, what fraction of my original outlay?
- (5.) Equal sums are invested at simple interest, one for 2 years 8 months at 4 $\frac{1}{2}$  per cent per annum, the other for 2 years 9 months at 6 $\frac{2}{3}$  per cent per annum, and the amounts received differ by £73, 12s. 6d. What was the sum invested in each case?
- (6.) A square field of 30 statute acres is laid out as a polo ground; a belt of uniform breadth all round, and equal to  $\frac{1}{8}$  of the whole field, is reserved for spectators. Find to two decimal places how many yards long is the side of the inner square.
- (7.) Find the length of the edge of a cubical cistern which contains as much as a cistern 68 ft. 3 ins. long, 45 ft. 6 ins. broad, and 30 ft. 4 ins. deep.
- (8.) Divide the cube root of  $405\frac{2}{15}$  by the square root of  $6\frac{1}{2}\frac{9}{25}$ .
- (9.) What sum of money would amount to £2812, 3s. 2 $\frac{1}{2}$ d. in 3 years at 4 per cent per annum compound interest?

- (10.) How much is gained or lost per cent by purchasing eggs at 5 for twopence, and selling half of them at 2 a penny and half at 3 a penny?
- (11.) If by selling 230 yards of cloth for £85, 5s. 10d. there is a loss of 11 per cent, at what price should it be sold per yard so as to gain 15 per cent?
- (12.) If the 3 per cent consols be at 90*g*, what sum must I invest in order to secure a yearly income of £469, after paying an income-tax of 5*½*d. in the £? Brokerage being  $\frac{1}{2}$  per cent.
- (13.) Find to the third decimal place of a penny the present worth of £1145, 18s. 2d. due  $4\frac{1}{2}$  years hence at 3*½* per cent per annum simple interest.
- (14.) How much less than the true present value will a banker give for a bill of £570, drawn 17th October at 4 months, and discounted 9th December at 4*¶* per cent?

## 1892.

- (1.) If the surface of a globe be taken as  $3\cdot14$  times the square of its diameter, find how many acres, roods, and perches there are on the surface of a globe 7912 miles in diameter.

- (2.) Express as the decimal of £5 the greatest common measure of  $\frac{1}{2} \times \frac{\frac{1}{2} - \frac{1}{3}}{0\cdot25}$  of £1,  $\frac{1}{0\cdot5} \times 0\cdot3$  of 2s. 6d., and  $\frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{3} - \frac{1}{4}}$  of a guinea.

- (3.) Simplify—

$$\frac{\frac{1}{8} \text{ of } (\frac{1}{6} + \frac{3}{2}) + \frac{1}{12} \text{ of } (\frac{2}{3} - \frac{1}{18})}{0\cdot35 \text{ of } \frac{1}{16} \div \frac{3}{8}} \times \frac{1}{1 + \frac{1}{2 + \frac{1}{3 + \frac{1}{4}}}} - \frac{32}{129}.$$

- (4.) If it cost £1, 5s. to paper a room 24 feet long, 21 feet wide, and 20 feet high with paper 1 yard wide, what will it cost to paper a room 32 feet long, 24 feet wide, and 18 feet high with paper 32 inches wide; the paper in the second case being 6d. per dozen yards dearer than in the first?

- (5.) A man rows down a stream 5 miles in 30 minutes, and rows back in 50 minutes; find the rate of the stream.

- (6.) The sum of £654 is borrowed for four years at a certain rate of simple interest; at the end of three years £800 more is borrowed at double the former rate, and at the end of the fourth year the sum of the interest on the two loans is £210, 16s. Find the rate of interest in the first case.

- (7.) What is the difference in height between a cube which contains 543338·496 cubic inches, and one whose entire surface contains 40936·56 square inches?

- (8.) Add together the square root of  $39\frac{1}{4}$ , and the cube root of  $51\frac{81}{125}$ .

- (9.) Find the compound interest on £3208, 13s. 4d. for  $1\frac{1}{2}$  years at 5 per cent per annum, interest payable half-yearly. You may neglect fractions of a penny.
- (10.) At what rate per cent compound interest will £1627, 12s. 1d. amount to £1904, 1s. 4d. in 4 years?
- (11.) A draper marks his goods for credit 25 per cent above cost price; if he takes 10 per cent off this for cash, what is his gain per cent in cash transactions?
- (12.) A person invests £1620 in the 3 per cents at 90, and sells out when they have risen to 93, and invests the proceeds in 4 per cents at 105; find the gain per cent in his income.
- (13.) The false or commercial discount on a bill due 3 months hence at 8 per cent per annum is £3, 3s. 9d.; find the true discount.
- (14.) I sell an article at 10 per cent loss; If I had bought it at 4 per cent less and received 4s. 6d. more, I should have gained  $12\frac{1}{2}$  per cent; find the cost price.

## 1893.

- (1.) When a certain number is multiplied by 365, the product is 54,099,676 greater than that obtained by multiplying by 214; how much greater still would the product be if the multiplier were 667?
- (2.) Find the cost of carpeting a room 24 feet 8 inches long and 17 feet 9 inches broad, with carpet 29 inches wide at 1s.  $9\frac{3}{4}$ d. per yard.
- (3.) A vessel contains 20 gallons of wine; one gallon is taken out and replaced by a gallon of water, then a gallon of the mixture is taken out and replaced by a gallon of water; after four such changes, how much wine remains in the vessel?
- (4.) The liabilities of a bankrupt are £2784, 10s. and his assets are £1113, 16s.; if one-fourth of his debts has to be paid in full, how much in the pound will the other creditors receive?
- (5.) A cistern can be filled by one tap in 1 hour and 20 minutes and emptied by another in 2 hours and 15 minutes; if the cistern is empty, and both taps allowed to flow together, in what time will it be filled?
- (6.) Find the number of days it will take £1460 to amount to £1504 if invested at 4 per cent per annum.
- (7.) Extract the cube root of 1472 correctly to two places of decimals.
- (8.) Simplify  $\sqrt[3]{\frac{.036 \div .004}{.576}} \times \sqrt{\frac{.285714 \times 1.75}{\frac{1}{.08}}}$
- (9.) What sum will amount to £108, 8s. 10d. in 2 years and 8 months at 4% per annum, compound interest?

- (10.) A grocer has 2 kinds of tea; selling the first at 2s. 2d. per lb. he gains 30 per cent and selling the second at 2s. 6d. per lb. he gains 20 per cent. What per cent. will he gain if he mix the two kinds in equal quantities and sell at 3s. 1½d. per lb?
- (11.) A milk dealer buys pure milk at 10½d. per gallon. What percentage of water must he add so that by selling at 2½d. a pint he may double his outlay?
- (12.) By investing my capital in the 4 per cents at 92 my income, after paying 4d. in the pound income-tax, is £786, 18s. 4d.
  - What would my income be if I had invested in the 3½ per cents at 80 and paid 6d. in the pound income-tax?
- (13.) Find the True Present Worth and Discount on a bill of £818, 8s. 9d. due 2 years 8 months hence at 2½ per cent per annum, simple interest.
- (14.) The false discount of a bill for 9 months at 2½ per cent per annum, simple interest, is £1, 6s. 8d. more than the true discount for the same time and rate. Find the amount of the bill.

# ANSWERS.—PART I.

## Exercise 1.

|         |           |              |              |
|---------|-----------|--------------|--------------|
| 1. 8.   | 7. 160.   | 13. 4,379.   | 19. 100,000. |
| 2. 15.  | 8. 107.   | 14. 2,705.   | 20. 300,001. |
| 3. 27.  | 9. 219.   | 15. 9,065.   | 21. 670,011. |
| 4. 30.  | 10. 870.  | 16. 8,001.   | 22. 910,010. |
| 5. 100. | 11. 909.  | 17. 70,016.  | 23. 611,050. |
| 6. 145. | 12. 6000. | 18. 930,085. | 24. 101,001. |

## Exercise 2.

- |  |                                 |
|--|---------------------------------|
| 1. Seventeen.  | 5. One hundred and sixty-three. |
| 2. Twenty.   | 6. One hundred and one.         |
| 3. Twenty-five.  | 7. One hundred and eleven.      |
| 4. Ninety-seven.                                       | 8. Nine hundred and ten.        |
| 9. Seven hundred and one.                              |                                 |
| 10. Two thousand four hundred and sixty-three.         |                                 |
| 11. Nine thousand eight hundred and one.               |                                 |
| 12. Seven thousand two hundred and ten.                |                                 |
| 13. Nine thousand and ten.                             |                                 |
| 14. Six thousand and eleven.                           |                                 |
| 15. Five thousand and five.                            |                                 |
| 16. Seven thousand and fifteen.                        |                                 |
| 17. Twenty-seven thousand and ten.                     |                                 |
| 18. Sixty-eight thousand three hundred and forty-five. |                                 |
| 19. Ninety thousand and five.                          |                                 |
| 20. Six hundred thousand.                              |                                 |
| 21. Seven hundred and ten thousand and eleven.         |                                 |
| 22. One hundred and twenty thousand and thirty.        |                                 |
| 23. Six hundred and one thousand and ten.              |                                 |
| 24. One hundred and one thousand and one.              |                                 |

## Exercise 3.

|          |          |           |           |             |
|----------|----------|-----------|-----------|-------------|
| 1. 19.   | 11. 189. | 21. 292.  | 31. 2425. | 41. 3,224.  |
| 2. 19.   | 12. 181. | 22. 314.  | 32. 2079. | 42. 3,004.  |
| 3. 20.   | 13. 215. | 23. 250.  | 33. 1896. | 43. 7,023.  |
| 4. 22.   | 14. 163. | 24. 216.  | 34. 1207. | 44. 9,399.  |
| 5. 23.   | 15. 197. | 25. 327.  | 35. 640.  | 45. 9,013.  |
| 6. 22.   | 16. 260. | 26. 257.  | 36. 1597. | 46. 7,328.  |
| 7. 27.   | 17. 150. | 27. 1483. | 37. 1356. | 47. 1,768.  |
| 8. 30.   | 18. 209. | 28. 1568. | 38. 3543. | 48. 17,119. |
| 9. 114.  | 19. 246. | 29. 1721. | 39. 3018. | 49. 11,788. |
| 10. 179. | 20. 233. | 30. 2060. | 40. 2583. | 50. 11,754. |

## Exercise 4.

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| 1. 2266.  | 13. 1578. | 25. 1107. | 37. 4243. | 49. 1348. |
| 2. 2600.  | 14. 1604. | 26. 1125. | 38. 4023. | 50. 1578. |
| 3. 2571.  | 15. 3907. | 27. 1802. | 39. 4026. | 51. 3366. |
| 4. 1679.  | 16. 3805. | 28. 2126. | 40. 4399. | 52. 2017. |
| 5. 2893.  | 17. 4069. | 29. 1360. | 41. 1954. | 53. 1794. |
| 6. 1294.  | 18. 4305. | 30. 2522. | 42. 2836. | 54. 1888. |
| 7. 2026.  | 19. 4227. | 31. 1266. | 43. 2351. | 55. 4477. |
| 8. 2377.  | 20. 4187. | 32. 2207. | 44. 1316. | 56. 4175. |
| 9. 1561.  | 21. 1802. | 33. 1575. | 45. 2278. | 57. 4370. |
| 10. 2408. | 22. 1571. | 34. 2592. | 46. 3285. | 58. 4109. |
| 11. 2352. | 23. 2756. | 35. 4478. | 47. 1606. | 59. 4115. |
| 12. 1414. | 24. 2035. | 36. 4024. | 48. 1882. | 60. 4125. |

## Exercise 5.

|               |                |                |
|---------------|----------------|----------------|
| 1. 6,701.     | 13. 1,423,582. | 25. 2,906,235. |
| 2. 15,049.    | 14. 1,617,200. | 26. 51,229.    |
| 3. 158,086.   | 15. 2,153,112. | 27. 45,404.    |
| 4. 67,438.    | 16. 2,808,026. | 28. 53,573.    |
| 5. 306,714.   | 17. 2,136,120. | 29. 71,342.    |
| 6. 111,519.   | 18. 2,112,891. | 30. 58,569.    |
| 7. 952,178.   | 19. 3,332,476. | 31. 405,452.   |
| 8. 2,256,337. | 20. 2,172,113. | 32. 3,922,334. |
| 9. 996,216.   | 21. 3,316,890. | 33. 5,124,501. |
| 10. 659,835.  | 22. 1,629,964. | 34. 7,097,258. |
| 11. 839,248.  | 23. 2,759,707. | 35. 7,617,480. |
| 12. 1,244,471 | 24. 2,665,120. | 36. 7,706,561. |

## Exercise 6.

|            |             |             |             |
|------------|-------------|-------------|-------------|
| 1. 13,621. | 6. 12,340.  | 11. 21,031. | 16. 13,748. |
| 2. 14,539. | 7. 11,769.  | 12. 6,434.  | 17. 15,656. |
| 3. 9,086.  | 8. 19,934.  | 13. 17,887. | 18. 21,829. |
| 4. 7,906.  | 9. 19,506.  | 14. 13,622. | 19. 18,136. |
| 5. 11,762. | 10. 17,881. | 15. 12,413. | 20. 16,589. |

## Exercise 7.

|         |          |                   |
|---------|----------|-------------------|
| 1. 21.  | 7. 66.   | 13. 160.          |
| 2. 45.  | 8. 21.   | 14. 60.           |
| 3. 100. | 9. 54.   | 15. 1010.         |
| 4. 42.  | 10. 21.  | 16. 38 shillings  |
| 5. 25.  | 11. 150. | 17. 100 shillings |
| 6. 44.  | 12. 49.  | 18. 48.           |

## Exercise 8.

|     |     |     |      |     |      |     |      |     |       |
|-----|-----|-----|------|-----|------|-----|------|-----|-------|
| 1.  | 5.  | 15. | 34.  | 29. | 359. | 43. | 87.  | 57. | 87.   |
| 2.  | 3.  | 16. | 322. | 30. | 530. | 44. | 392. | 58. | 189.  |
| 3.  | 3.  | 17. | 622. | 31. | 86.  | 45. | 437. | 59. | 4279. |
| 4.  | 4.  | 18. | 122. | 32. | 593. | 46. | 771. | 60. | 5954. |
| 5.  | 3.  | 19. | 131. | 33. | 551. | 47. | 217. | 61. | 699.  |
| 6.  | 6.  | 20. | 101. | 34. | 232. | 48. | 676. | 62. | 1355. |
| 7.  | 5.  | 21. | 179. | 35. | 1.   | 49. | 361. | 63. | 7192. |
| 8.  | 1.  | 22. | 298. | 36. | 198. | 50. | 582. | 64. | 6291. |
| 9.  | 2.  | 23. | 283. | 37. | 99.  | 51. | 843. | 65. | 4428. |
| 10. | 6.  | 24. | 488. | 38. | 289. | 52. | 244. | 66. | 2647. |
| 11. | 12. | 25. | 353. | 39. | 83.  | 53. | 275. | 67. | 7338. |
| 12. | 13. | 26. | 53.  | 40. | 10.  | 54. | 546. | 68. | 7189. |
| 13. | 51. | 27. | 772. | 41. | 325. | 55. | 861. | 69. | 6389. |
| 14. | 22. | 28. | 123. | 42. | 258. | 56. | 298. | 70. | 7999. |

## Exercise 9.

|     |         |     |          |     |             |
|-----|---------|-----|----------|-----|-------------|
| 1.  | 1,941.  | 26. | 19,389.  | 51. | 13,111,402. |
| 2.  | 1,455.  | 27. | 32,636.  | 52. | 5,572,262.  |
| 3.  | 5,752.  | 28. | 33,641.  | 53. | 69,596,349. |
| 4.  | 863.    | 29. | 28,446.  | 54. | 2,757,171.  |
| 5.  | 128.    | 30. | 60,742.  | 55. | 1,390,834.  |
| 6.  | 1,018.  | 31. | 312,758. | 56. | 7,888,889.  |
| 7.  | 5,706.  | 32. | 19,671.  | 57. | 1,900,098.  |
| 8.  | 3,684.  | 33. | 102,195. | 58. | 1,711,451.  |
| 9.  | 4,889.  | 34. | 99,655.  | 59. | 5,722,123.  |
| 10. | 2,700.  | 35. | 605,682. | 60. | 35,397,837. |
| 11. | 5,555.  | 36. | 315,195. | 61. | 51,627.     |
| 12. | 3,564.  | 37. | 225,592. | 62. | 41,622.     |
| 13. | 1,990.  | 38. | 9,981.   | 63. | 54,745.     |
| 14. | 8,481.  | 39. | 217,334. | 64. | 656,855.    |
| 15. | 208.    | 40. | 850,764. | 65. | 103,475.    |
| 16. | 4,233.  | 41. | 54,747.  | 66. | 74,476.     |
| 17. | 209.    | 42. | 656,854. | 67. | 36,849.     |
| 18. | 6,463.  | 43. | 103,475. | 68. | 275,515.    |
| 19. | 4,960.  | 44. | 275,517. | 69. | 288,642.    |
| 20. | 31.     | 45. | 288,643. | 70. | 16,094.     |
| 21. | 7,461.  | 46. | 16,096.  | 71. | 1,390,834.  |
| 22. | 8,735.  | 47. | 732,172. | 72. | 7,888,889.  |
| 23. | 11,555. | 48. | 281,568. | 73. | 1,900,098.  |
| 24. | 2,414.  | 49. | 424,469. | 74. | 50,348,491. |
| 25. | 9,734.  | 50. | 820,789. |     |             |

## Exercise 10.

|          |          |           |           |           |
|----------|----------|-----------|-----------|-----------|
| 1. 2480. | 5. 1116. | 9. 1794.  | 13. 3459. | 17. 130.  |
| 2. 237.  | 6. 7804. | 10. 1259. | 14. 1986. | 18. 1596. |
| 3. 1963. | 7. 2295. | 11. 2664. | 15. 54.   | 19. 838.  |
| 4. 5669. | 8. 170.  | 12. 441.  | 16. 7448. | 20. 940.  |

## Exercise 11.

|               |                 |                |
|---------------|-----------------|----------------|
| 1. 1 penny.   | 7. 45 miles.    | 13. 21 fish.   |
| 2. 15 sheep.  | 8. 6 days.      | 14. 100 runs.  |
| 3. 1866.      | 9. 8 shillings. | 15. 24 boys.   |
| 4. 7 plums.   | 10. 72 pens.    | 16. 38 years.  |
| 5. 17 pounds. | 11. 8 sheep.    | 17. 52 years.  |
| 6. 39 nuta.   | 12. 6 pounds.   | 18. 200 sheep. |

## Exercise 12.

|                |                |                |
|----------------|----------------|----------------|
| 1. 8,246.      | 27. 18,420.    | 53. 42,270.    |
| 2. 10,604.     | 28. 29,264.    | 54. 56,208.    |
| 3. 12,286.     | 29. 34,800.    | 55. 2,583,714. |
| 4. 14,864.     | 30. 36,268.    | 56. 5,167,428. |
| 5. 16,082.     | 31. 2,952,236. | 57. 4,200,840. |
| 6. 18,468.     | 32. 2,419,156. | 58. 3,113,164. |
| 7. 26,414.     | 33. 1,304,720. | 59. 1,978,560. |
| 8. 1,286,436.  | 34. 3,396,868. | 60. 5,925,924. |
| 9. 1,863,680.  | 35. 3,752,024. | 61. 5,121,106. |
| 10. 750,052.   | 36. 1,827,156. | 62. 2,774,947. |
| 11. 975,226.   | 37. 16,050.    | 63. 6,359,332. |
| 12. 1,135,780. | 38. 20,660.    | 64. 6,044,290. |
| 13. 12,693.    | 39. 26,070.    | 65. 6,042,967. |
| 14. 15,369.    | 40. 30,265.    | 66. 589,134.   |
| 15. 18,009.    | 41. 35,825.    | 67. 6,539,099. |
| 16. 21,912.    | 42. 40,045.    | 68. 4,216,688. |
| 17. 24,396.    | 43. 1,854,360. | 69. 613,438.   |
| 18. 27,186.    | 44. 4,553,680. | 70. 6,315,288. |
| 19. 983,427.   | 45. 4,003,960. | 71. 277,235.   |
| 20. 535,080.   | 46. 2,162,835. | 72. 6,724,088. |
| 21. 891,024.   | 47. 993,250.   | 73. 251,600.   |
| 22. 2,208,057. | 48. 2,839,450. | 74. 481,896.   |
| 23. 1,640,427. | 49. 19,206.    | 75. 736,592.   |
| 24. 2,962,962. | 50. 24,738.    | 76. 477,184.   |
| 25. 16,480.    | 51. 31,380.    | 77. 525,824.   |
| 26. 14,096.    | 52. 37,884.    | 78. 431,568.   |

|     |             |      |            |      |              |
|-----|-------------|------|------------|------|--------------|
| 79. | 547,936.    | 91.  | 7,892,487. | 103. | 4,761,924.   |
| 80. | 6,347,240.  | 92.  | 7,047,485. | 104. | 8,869,032.   |
| 81. | 773,984.    | 93.  | 8,260,785. | 105. | 64,776,804.  |
| 82. | 3,854,152.  | 94.  | 5,157,864. | 106. | 9,920,856.   |
| 83. | 30,284,832. | 95.  | 7,077,708. | 107. | 46,903,524.  |
| 84. | 77,652,384. | 96.  | 2,877,885. | 108. | 47,529,924.  |
| 85. | 46,206.     | 97.  | 6,827,390. | 109. | 6,885,912.   |
| 86. | 542,943.    | 98.  | 8,629,370. | 110. | 103,552,608. |
| 87. | 702,414.    | 99.  | 7,509,799. | 111. | 4,761,924.   |
| 88. | 8,731,944.  | 100. | 9,107,648. | 112. | 10,896,876.  |
| 89. | 3,534,156.  | 101. | 6,531,877. | 113. | 8,251,176.   |
| 90. | 4,265,028.  | 102. | 3,596,274. | 114. | 6,349,044.   |

## Exercise 13.

|    |          |     |            |     |             |     |             |
|----|----------|-----|------------|-----|-------------|-----|-------------|
| 1. | 164,514. | 7.  | 149,796.   | 13. | 9,272,153.  | 19. | 2,639,710.  |
|    | 246,771. |     | 49,932.    |     | 10,115,076. |     | 2,903,681.  |
|    | 301,609. |     | 112,347.   |     | 4,214,615.  |     | 1,847,797.  |
| 2. | 421,825. | 8.  | 1,008,766. | 14. | 1,536,402.  | 20. | 10,121,604. |
|    | 590,555. |     | 1,100,472. |     | 1,755,888.  |     | 8,434,670.  |
|    | 759,285. |     | 733,648.   |     | 2,414,346.  |     | 9,278,137.  |
| 3. | 133,336. | 9.  | 162,460.   | 15. | 4,433,544.  | 21. | 225,390.    |
|    | 190,480. |     | 243,690.   |     | 6,650,316.  | 22. | 680,142.    |
|    | 228,576. |     | 324,920.   |     | 8,867,088.  | 23. | 3,043,568.  |
| 4. | 463,170. | 10. | 221,688.   | 16. | 1,491,708.  | 24. | 4,881,150.  |
|    | 509,487. |     | 332,532.   |     | 372,927.    | 25. | 4,258,134.  |
|    | 555,804. |     | 406,428.   |     | 621,545.    | 26. | 1,143,774.  |
| 5. | 549,640. | 11. | 735,768.   | 17. | 1,468,390.  | 27. | 579,944.    |
|    | 343,525. |     | 1,287,594. |     | 2,055,746.  | 28. | 704,385.    |
|    | 618,345. |     | 1,839,420. |     | 2,643,102.  | 29. | 328,566.    |
| 6. | 655,344. | 12. | 3,333,762. | 18. | 4,139,696.  | 30. | 204,450.    |
|    | 728,160. |     | 4,074,598. |     | 5,174,620.  |     |             |
|    | 873,792. |     | 1,111,254. |     | 6,209,544.  |     |             |

## Exercise 14.

|    |             |     |             |     |             |
|----|-------------|-----|-------------|-----|-------------|
| 1. | 21,227,808. | 8.  | 4,925,322.  | 15. | 31,461,768. |
| 2. | 16,777,740. | 9.  | 33,974,577. | 16. | 25,069,560. |
| 3. | 57,350,076. | 10. | 49,215,672. | 17. | 44,844,492. |
| 4. | 15,489,306. | 11. | 32,569,570. | 18. | 89,420,544. |
| 5. | 10,694,349. | 12. | 19,346,008. | 19. | 89,519,067. |
| 6. | 16,586,640. | 13. | 47,348,864. | 20. | 90,567,872. |
| 7. | 10,374,640. | 14. | 16,615,928. |     |             |

## Exercise 15.

|                 |                |                 |
|-----------------|----------------|-----------------|
| 1. 62,478,256.  | 21. 4,055,925. | 41. 1,846,700.  |
| 2. 68,014,304.  | 22. 4,110,004. | 42. 4,284,344.  |
| 3. 30,843,696.  | 23. 3,190,661. | 43. 7,446,080.  |
| 4. 45,079,248.  | 24. 2,000,923. | 44. 6,701,472.  |
| 5. 60,105,664.  | 25. 6,478,632. | 45. 3,629,964.  |
| 6. 30,052,832.  | 26. 5,166,504. | 46. 4,374,572.  |
| 7. 48,386,232.  | 27. 6,560,640. | 47. 5,212,256.  |
| 8. 23,012,964.  | 28. 6,396,624. | 48. 7,259,928.  |
| 9. 33,634,332.  | 29. 1,968,192. | 49. 2,440,566.  |
| 10. 40,125,168. | 30. 5,658,552. | 50. 2,172,699.  |
| 11. 5,605,722.  | 31. 1,190,520. | 51. 2,678,670.  |
| 12. 39,535,092. | 32. 2,440,566. | 52. 2,559,618.  |
| 13. 16,571,672. | 33. 2,351,277. | 53. 2,827,485.  |
| 14. 17,410,744. | 34. 1,696,491. | 54. 2,470,329.  |
| 15. 14,473,992. | 35. 1,875,069. | 55. 31,366,320. |
| 16. 16,361,904. | 36. 2,648,907. | 56. 30,974,241. |
| 17. 11,327,472. | 37. 2,142,172. | 57. 24,700,977. |
| 18. 12,166,544. | 38. 2,733,116. | 58. 32,934,636. |
| 19. 3,731,451.  | 39. 5,170,760. | 59. 37,247,505. |
| 20. 2,055,002.  | 40. 7,091,328. | 60. 28,229,688. |

## Exercise 16.

|                |                 |                  |
|----------------|-----------------|------------------|
| 1. 486,248.    | 11. 15,076,944. | 21. 6,868,224.   |
| 1,458,744.     | 7,538,472.      | 10,302,336.      |
| 2. 1,362,816.  | 12. 19,180,896. | 22. 170,343,664. |
| 2,044,224.     | 28,771,344.     | 255,515,496.     |
| 3. 1,226,700.  | 13. 36,678,288. | 23. 64,406,130.  |
| 2,317,100.     | 73,356,576.     | 193,218,390.     |
| 4. 3,367,598.  | 14. 32,905,866. | 24. 15,210,774.  |
| 10,102,794.    | 49,358,799.     | 18,682,302.      |
| 5. 78,632,895. | 15. 6,170,490.  | 25. 69,371,964.  |
| 127,242,321.   | 7,114,212.      | 104,057,946.     |
| 6. 20,390,216. | 16. 4,499,960.  | 26. 5,646,504.   |
| 30,585,324.    | 3,599,968.      | 11,293,008.      |
| 7. 7,461,300.  | 17. 3,367,598.  | 27. 5,497,800.   |
| 5,969,040.     | 5,051,397.      | 21,991,200.      |
| 8. 1,350,123.  | 18. 3,754,512.  | 28. 31,884,470.  |
| 6,750,615.     | 15,018,048.     | 34,585,850.      |
| 9. 1,193,265.  | 19. 30,729,788. | 29. 36,380,250.  |
| 1,776,639.     | 2,062,844.      | 109,140,750.     |
| 10. 6,283,488. | 20. 29,105,349. | 30. 27,036,288.  |
| 9,425,232.     | 7,132.          | 9,012,198.       |

|              |     |              |     |                 |
|--------------|-----|--------------|-----|-----------------|
| 28,879,785.  | 36. | 27,999,972.  | 41. | 35,665,000.     |
| 38,506,380.  |     | 44,241,120.  | 42. | 11,078,424.     |
| 62,706,445.  | 37. | 78,976,800.  | 43. | 182,151,828.    |
| 51,397,537.  |     | 98,721,000.  | 44. | 11,155,248.     |
| 26,005,032.  | 38. | 52,847,241.  | 45. | 148,644,288.    |
| 8,668,344.   |     | 44,315,067.  | 46. | 1,724,573,025.  |
| 25,988,652.  | 39. | 163,936,128. | 47. | 524,085,520.    |
| 51,977,304.  |     | 81,968,064.  | 48. | 374,511,980.    |
| 97,533,579.  | 40. | 586,623,764. | 49. | 8,828,716,566.  |
| 122,087,487. |     | 776,097,448. | 50. | 52,192,218,896. |

**Exercise 17.**

- |                     |                      |
|---------------------|----------------------|
| 1. 44,772.          | 16. 4,555,378,620.   |
| 2. 262,794.         | 17. 152,288,000.     |
| 3. 432,692.         | 18. 1,992,648.       |
| 4. 671,353,557.     | 19. 91,132,497.      |
| 5. 1,290,173,852.   | 20. 4,049,221,860.   |
| 6. 78,535,792.      | 21. 1,661,443 lbs.   |
| 7. 12,384,784.      | 22. 25,830 miles.    |
| 8. 305,250 pages.   | 23. 48,288,058.      |
| 9. 1,661,443 lbs.   | 24. 1,183,560 pence. |
| 10. 25,830 miles.   | 25. 707,520 yards.   |
| 11. 72,072 lbs.     | 26. 720 miles.       |
| 12. 11,230,404,971. | 27. 31,884,470.      |
| 13. 31,884,470.     | 28. 71,540 miles.    |
| 14. 48,288,058.     | 29. 13,702 men.      |
| 15. 7,614,328,386.  | 30. 91,132,497.      |

**Exercise 18.**

- |          |                 |                  |
|----------|-----------------|------------------|
| 24,103.  | 16. 11,415.     | 31. 81,309.      |
| 43,021.  | 17. 13,085.     | 32. 49,418.      |
| 34,238.  | 18. 14,092.     | 33. 118,995 + 2. |
| 310,989. | 19. 11,512.     | 34. 77,097 + 3.  |
| 32,293.  | 20. 15,130.     | 35. 118,524 + 5. |
| 13,210.  | 21. 15,144 + 3. | 36. 41,955 + 2.  |
| 32,004.  | 22. 13,498 + 5. | 37. 11,202.      |
| 21,153.  | 23. 14,946 + 4. | 38. 24,008.      |
| 32,421.  | 24. 16,306 + 5. | 39. 91,996.      |
| 22,528.  | 25. 15,512 + 2. | 40. 36,710 + 4.  |
| 12,016.  | 26. 11,824 + 2. | 41. 49,603 + 3.  |
| 22,307.  | 27. 13,489 + 3. | 42. 40,508 + 5.  |
| 21,024.  | 28. 16,310 + 4. | 43. 25,961 + 5.  |
| 11,306.  | 29. 7,102.      | 44. 25,221 + 0.  |
| 12,013.  | 30. 52,121.     | 45. 32,051 + 0.  |

|     |              |     |                |      |                |
|-----|--------------|-----|----------------|------|----------------|
| 46. | 40,919 + 8.  | 73. | 12,521.        | 87.  | 35,824.        |
| 47. | 93,076 + 0.  |     | 9,738 + 5.     |      | 78,812 + 4.    |
| 48. | 23,092 + 6.  | 74. | 11,791.        | 88.  | 90,384.        |
| 49. | 40,919 + 8.  |     | 9,432 + 8.     |      | 361,536.       |
| 50. | 33,192 + 8.  | 75. | 4,808.         | 89.  | 92,497.        |
| 51. | 92,181 + 5.  |     | 3,606.         |      | 158,566 + 2.   |
| 52. | 91,932 + 6.  | 76. | 62,904.        | 90.  | 92,563.        |
| 53. | 73,968.      |     | 47,178.        |      | 113,132 + 5.   |
| 54. | 29,683 + 4.  | 77. | 121,902.       | 91.  | 99,906.        |
| 55. | 82,736 + 8.  |     | 108,357 + 3.   |      | 119,887 + 2.   |
| 56. | 39,276 + 8.  | 78. | 66,250.        | 92.  | 107,328 + 5.   |
| 57. | 36,075 + 0.  |     | 42,159 + 1.    |      | 89,440 + 5.    |
| 58. | 75,395 + 1.  | 79. | 529,225.       | 93.  | 41,936.        |
| 59. | 78,452 + 1.  |     | 396,918 + 9.   |      | 31,452.        |
| 60. | 29,713 + 2.  | 80. | 600,080.       | 94.  | 72,912.        |
| 61. | 29,763 + 3.  |     | 420,056.       |      | 46,398 + 6.    |
| 62. | 17,281 + 10. | 81. | 800,005.       | 95.  | 595,378 + 1.   |
| 63. | 18,354 + 7.  |     | 1,200,007 + 3. |      | 396,918 + 9.   |
| 64. | 76,327 + 10. | 82. | 672,013.       | 96.  | 600,080.       |
| 65. | 75,723 + 0.  |     | 940,818 + 1.   |      | 381,869 + 1.   |
| 66. | 33,068 + 11. | 83. | 146,098.       | 97.  | 800,005.       |
| 67. | 56,911 + 3.  |     | 81,165 + 5.    |      | 1,028,577 + 6. |
| 68. | 31,080 + 8.  | 84. | 72,912.        | 98.  | 672,013.       |
| 69. | 330,689 + 7. |     | 46,398 + 6.    |      | 470,409 + 1.   |
| 70. | 50,673 + 3.  | 85. | 750,428.       | 99.  | 627,352 + 2.   |
| 71. | 25,724 + 7.  |     | 1,000,570 + 4. |      | 575,072 + 10.  |
| 72. | 61,080 + 8.  | 86. | 604,514 + 5.   | 100. | 137,174 + 1.   |
|     |              |     | 302,257 + 5.   |      | 176,366 + 5.   |

## Exercise 19.

|     |              |     |                 |     |                  |
|-----|--------------|-----|-----------------|-----|------------------|
| 1.  | 10,780.      | 14. | 198,803 + 35.   | 28. | 489,675 + 13.    |
| 2.  | 11,154.      | 15. | 56,787 + 2.     | 29. | 491,085.         |
| 3.  | 4,780 + 7.   | 16. | 148,699 + 47.   | 30. | 182,642.         |
| 4.  | 7,973 + 23.  | 17. | 158,265 + 21.   | 31. | 6,295,503 + 4.   |
| 5.  | 13,638 + 13. | 18. | 90,357 + 12.    | 32. | 12,604,718.      |
| 6.  | 45,375 + 1.  | 19. | 93,843 + 39.    | 33. | 4,802,964 + 47.  |
| 7.  | 6,052 + 33.  | 20. | 43,770 + 16.    | 34. | 1,964,340.       |
| 8.  | 21,700.      | 21. | 1,015,326 + 31. | 35. | 2,451,577 + 38.  |
| 9.  | 10,709.      | 22. | 191,693 + 49.   | 36. | 5,310,903 + 42.  |
| 10. | 4,350.       | 23. | 783,473.        | 37. | 3,104,008 + 17.  |
| 11. | 30,397 + 30. | 24. | 3,796,666 + 12. | 38. | 5,823,918 + 111. |
| 12. | 26,517 + 23. | 25. | 209,657.        | 39. | 887,567 + 6.     |
| 13. | 30,268 + 27. | 26. | 2,972,317 + 1.  | 40. | 6,984,908 + 89.  |
|     |              |     | 208,149.        |     |                  |

## Exercise 20.

|                |                      |                       |           |
|----------------|----------------------|-----------------------|-----------|
| 1. 1247.       | 5. 1328.             | 9. 2374.              | 13. 9142. |
| 2. 5842.       | 6. 7149.             | 10. 2475.             | 14. 1527. |
| 3. 3274.       | 7. 7182.             | 11. 6183.             | 15. 3415. |
| 4. 4193.       | 8. 1543.             | 12. 3248.             | 16. 2145. |
| 17. 3184.      | 55. 1,528 + 12.      | 93. 45,360,625 + 3.   |           |
| 18. 5146.      | 56. 1,729 + 12.      | 94. 42,525,586 + 2.   |           |
| 19. 9128.      | 57. 1,738.           | 95. 9,704,439 + 21.   |           |
| 20. 4382.      | 58. 2,134.           | 96. 10,794,825 + 57.  |           |
| 21. 3146.      | 59. 2,264.           | 97. 12,161,259 + 21.  |           |
| 22. 3275.      | 60. 1,492.           | 98. 13,923,760 + 42.  |           |
| 23. 6492 + 7.  | 61. 4,089.           | 99. 8,739,732 + 49.   |           |
| 24. 4527 + 10. | 62. 5,607 + 12.      | 100. 9,732,883 + 81.  |           |
| 25. 4632 + 1.  | 63. 7,038 + 3.       | 101. 10,980,689 + 43. |           |
| 26. 3927.      | 64. 8,070 + 8.       | 102. 12,595,496 + 57. |           |
| 27. 4639 + 3.  | 65. 7,060 + 10.      | 103. 40,024,081 + 1.  |           |
| 28. 2947.      | 66. 5,080.           | 104. 37,800,521.      |           |
| 29. 4634 + 10. | 67. 7,090 + 17.      | 105. 35,811,019 + 17. |           |
| 30. 5329.      | 68. 48,030.          | 106. 34,020,468 + 18. |           |
| 31. 5294 + 1.  | 69. 40,607 + 5.      | 107. 50,800,672.      |           |
| 32. 4582.      | 70. 30,704.          | 108. 47,172,052 + 8.  |           |
| 33. 2976 + 4.  | 71. 3,076.           | 109. 44,027,249 + 1.  |           |
| 34. 1382 + 12. | 72. 7,408 + 7.       | 110. 41,275,546.      |           |
| 35. 1469 + 3.  | 73. 5,073 + 2.       | 111. 9,300,389 + 38.  |           |
| 36. 1924.      | 74. 6,090 + 7.       | 112. 10,345,376 + 85. |           |
| 37. 2219.      | 75. 4,090 + 26.      | 113. 11,654,918 + 27. |           |
| 38. 2176.      | 76. 3,060.           | 114. 13,344,036 + 65. |           |
| 39. 1487.      | 77. 3,070 + 19.      | 115. 8,540,240 + 67.  |           |
| 40. 4537.      | 78. 37,060.          | 116. 9,510,722 + 51.  |           |
| 41. 2217.      | 79. 30,904 + 4.      | 117. 10,730,045 + 77. |           |
| 42. 3129.      | 80. 20,903.          | 118. 12,307,993 + 63. |           |
| 43. 3742 + 3.  | 81. 879,060 + 46.    | 119. 38,847,572 + 12. |           |
| 44. 7348 + 3.  | 82. 609,087 + 3.     | 120. 36,689,374 + 4.  |           |
| 45. 3728.      | 83. 709,065.         | 121. 34,758,354 + 10. |           |
| 46. 4385 + 3.  | 84. 309,052.         | 122. 33,020,436 + 16. |           |
| 47. 3678 + 4.  | 85. 609,073 + 20.    | 123. 53,103,285 + 2.  |           |
| 48. 3729.      | 86. 790,640.         | 124. 49,310,193 + 5.  |           |
| 49. 3746.      | 87. 390,807 + 7.     | 125. 46,022,847 + 2.  |           |
| 50. 4927.      | 88. 594,070 + 66.    | 126. 43,146,419 + 3.  |           |
| 51. 2639 + 2.  | 89. 467,080 + 48.    | 127. 40,608,394 + 9.  |           |
| 52. 3758.      | 90. 507,080 + 69.    | 128. 38,352,372 + 11. |           |
| 53. 4965 + 3.  | 91. 52,339,182 + 12. | 129. 36,333,826 + 13. |           |
| 54. 1428.      | 92. 48,600,669 + 12. | 130. 34,517,135 + 7.  |           |

|                    |                    |                     |
|--------------------|--------------------|---------------------|
| 131. 76,090 + 20.  | 141. 63,090 + 24.  | 151. 555 + 5006.    |
| 132. 63,070 + 106. | 142. 97,050 + 14.  | 152. 34,959 + 716.  |
| 133. 89,060 + 227. | 143. 70,090 + 4.   | 153. 7,777.         |
| 134. 79,004 + 15.  | 144. 50,709.       | 154. 14,959 + 96.   |
| 135. 37,006 + 16.  | 145. 30,604.       | 155. 20,282 + 2660. |
| 136. 79,364.       | 146. 70,903 + 100. | 156. 27,412 + 41.   |
| 137. 60,089.       | 147. 90,706.       | 157. 8 + 7,085.     |
| 138. 80,070 + 8.   | 148. 50,076.       | 158. 364 + 3,005.   |
| 139. 47,050 + 97.  | 149. 60,507 + 300. | 159. 57 + 19,515.   |
| 140. 76,080 + 7.   | 150. 30,504.       | 160. 45,067.        |

## Exercise 21.

|                 |                  |                  |
|-----------------|------------------|------------------|
| 1. 443 + 21.    | 8. 49,353 + 72.  | 15. 24,582 + 41. |
| 2. 54.          | 9. 45,000.       | 16. 180 hours.   |
| 3. 94 + 1.      | 10. 157,548 + 2. | 17. 40,058 + 4.  |
| 4. 312.         | 11. 1326 + 441.  | 18. 4026.        |
| 5. 537 + 3.     | 12. 927 + 80.    | 19. 476 days.    |
| 6. 13,557 + 36. | 13. 2946 + 453.  | 20. 5555 + 100.  |
| 7. 111,596 + 3. | 14. 78,540.      |                  |

## Exercise 22.

| £          | s. | d.                   | £          | s. | d.                   | £           | s. | d.          |
|------------|----|----------------------|------------|----|----------------------|-------------|----|-------------|
| 1. 0       | 9  | 8.                   | 21. 1,285  | 1  | 8 <i>1</i> <i>2</i>  | 41. 1,838   | 7  | 11 <i>1</i> |
| 2. 0       | 11 | 9.                   | 22. 1,112  | 7  | 8 <i>2</i> <i>1</i>  | 42. 6,897   | 2  | 11 <i>1</i> |
| 3. 1       | 1  | 6.                   | 23. 1,417  | 14 | 3.                   | 43. 1,605   | 17 | 9.          |
| 4. 12      | 2  | 7.                   | 24. 1,228  | 6  | 4 <i>1</i> <i>2</i>  | 44. 3,972   | 10 | 4 <i>1</i>  |
| 5. 249     | 19 | 11.                  | 25. 1,273  | 11 | 11 <i>1</i>          | 45. 3,815   | 12 | 6 <i>1</i>  |
| 6. 520     | 18 | 10.                  | 26. 1,485  | 18 | 4 <i>1</i> <i>2</i>  | 46. 1,433   | 12 | 7 <i>1</i>  |
| 7. 1,187   | 19 | 0.                   | 27. 2,423  | 3  | 3 <i>1</i> <i>2</i>  | 47. 3,065   | 11 | 11 <i>1</i> |
| 8. 1,098   | 0  | 3.                   | 28. 1,598  | 1  | 4.                   | 48. 9,049   | 17 | 3 <i>1</i>  |
| 9. 1,176   | 19 | 7.                   | 29. 9,611  | 12 | 3 <i>1</i> <i>2</i>  | 49. 1,299   | 6  | 10.         |
| 10. 1,069  | 17 | 4.                   | 30. 6,569  | 16 | 11 <i>1</i> <i>2</i> | 50. 6,229   | 4  | 5.          |
| 11. 1,756  | 18 | 1.                   | 31. 707    | 1  | 10 <i>1</i> <i>2</i> | 51. 5,865   | 9  | 11 <i>1</i> |
| 12. 358    | 15 | 11.                  | 32. 1,862  | 2  | 7 <i>1</i> <i>2</i>  | 52. 6,016   | 17 | 4 <i>1</i>  |
| 13. 1,202  | 16 | 4.                   | 33. 8,138  | 19 | 1 <i>1</i> <i>2</i>  | 53. 1,052   | 15 | 8 <i>1</i>  |
| 14. 1,572  | 7  | 1.                   | 34. 1,161  | 11 | 11 <i>1</i> <i>2</i> | 54. 4,805   | 1  | 4.          |
| 15. 10,392 | 9  | 7 <i>1</i> <i>2</i>  | 35. 21,895 | 19 | 5.                   | 55. 103,663 | 8  | 5 <i>1</i>  |
| 16. 319    | 8  | 1 <i>1</i> <i>2</i>  | 36. 23,912 | 14 | 4 <i>1</i> <i>2</i>  | 56. 34,364  | 5  | 7 <i>1</i>  |
| 17. 1,983  | 10 | 2.                   | 37. 16,724 | 14 | 4 <i>1</i> <i>2</i>  | 57. 3,611   | 17 | 2 <i>1</i>  |
| 18. 10,908 | 6  | 10 <i>1</i> <i>2</i> | 38. 23,575 | 10 | 10.                  | 58. 14,532  | 4  | 11 <i>1</i> |
| 19. 1,252  | 8  | 9 <i>1</i> <i>2</i>  | 39. 34,916 | 9  | 10.                  | 59. 19,856  | 10 | 10.         |
| 20. 704    | 14 | 6.                   | 40. 20,161 | 6  | 5.                   | 60. 41,043  | 1  | 11.         |

## EXAMINATION EXERCISES FOR THIRD CLASS.

|                     |                       |
|---------------------|-----------------------|
| A.                  | B.                    |
| 1. 986,778.         | 1. 826,011.           |
| 2. 87,098,693.      | 2. 6,053,576.         |
| 3. 139,823 + 4.     | 3. 42,099 + 1.        |
| 4. £335. 10s. 5½d.  | 4. £11,037. 8s. 9d.   |
| 5. 42,032 + 17.     | 5. 50,000 + 9.        |
| C.                  | D.                    |
| 1. 381,071.         | 1. 408,027.           |
| 2. 4,001,436.       | 2. 37,046,583.        |
| 3. 40,935 + 7.      | 3. 27,217 + 4.        |
| 4. £9656. 17s. 6¾d. | 4. £10,238. 9s. 10½d. |
| 5. 5801 + 37.       | 5. 22,740 + 8.        |
| E.                  | F.                    |
| 1. 81,519.          | 1. 20,902.            |
| 2. 3,826,802.       | 2. 7,527,851.         |
| 3. 32,686 + 5.      | 3. 40,659.            |
| 4. £2342. 15s. 8½d. | 4. 14,540. 9s. 0¾d.   |
| 5. 10,453 + 54.     | 5. 10,589 + 7.        |
| G.                  | H.                    |
| 1. 182,861.         | 1. 501,530.           |
| 2. 51,630,464.      | 2. 9,667,406.         |
| 3. 40,659.          | 3. 78,493 + 1.        |
| 4. £10,850. 18s.    | 4. £10,685. 1s. 11½d. |
| 5. 1259 + 74.       | 5. 42,560 + 13.       |
| I.                  | K.                    |
| 1. 681,716.         | 1. 401,697.           |
| 2. 5,659,520.       | 2. 1,492,491.         |
| 3. 129,505 + 2.     | 3. 78,404 + 4.        |
| 4. £1648. 12s. 1¼d. | 4. £1139. 14s. 5½d.   |
| 5. 31,372 + 5.      | 5. 10,794 + 59.       |
| L.                  | M.                    |
| 1. 89,998.          | 1. 890,755.           |
| 2. 3,404,742.       | 2. 6,651,411.         |
| 3. 37,260 + 3.      | 3. 54,445 + 1.        |
| 4. £2491. 10s. 3½d. | 4. £10,085. 15s. 9¾d. |
| 5. 6954 + 2.        | 5. 1075 + 14.         |

|  |   |
|--|---|
| <b>N.</b>  | <b>O.</b>   |
| 1. 71,401.<br>2. 1,840,180.<br>3. 64,148 + 0.<br>4. £3001. 13s. 4½d.<br>5. 10,000 + 14.    | 1. 405,747.<br>2. 6,815,175.<br>3. 12,567 + 1.<br>4. £14,523. 12s. 10½d.<br>5. 15,805 + 28. |
| <b>P.</b>  | <b>R.</b>   |
| 1. 6004,001.<br>2. 2,840,048.<br>3. 30,274 + 4.<br>4. £10,201. 17s. 4d.<br>5. 7423 + 77.   | 1. 90,992.<br>2. 4,939,724.<br>3. 112,613 + 5.<br>4. £10,219. 12s. 8½d.<br>5. 5050 + 9.     |
| <b>S.</b>  | <b>T.</b>   |
| 1. 401,430.<br>2. 3,047,282.<br>3. 21,877 + 7.<br>4. £17,017. 10s. 0½d.<br>5. 6,122 + 23.  | 1. 189,200.<br>2. 7,467,060.<br>3. 82,406 + 7.<br>4. £13,177. 11s. 9½d.<br>5. 36,340 + 11.  |
| <b>U.</b>  | <b>V.</b>   |
| 1. 94,711.<br>2. 7,314,300.<br>3. 39,018 + 2.<br>4. 13,004. 14s. 11½d.<br>5. 8087 + 23.    | 1. 109,415.<br>2. 4,400,982.<br>3. 60,375 + 6.<br>4. 11,095. 4s. 6½d.<br>5. 1332 + 32.      |
| <b>W.</b>  | <b>X.</b>   |
| 1. 970,001.<br>2. 80,343,440.<br>3. 14,410 + 1.<br>4. £11,653. 2s. 3½d.<br>5. 8383 + 62.   | 1. 81,757.<br>2. 5,421,624.<br>3. 56,256 + 4.<br>4. £22,378. 9s. 9½d.<br>5. 1052 + 69.      |
| <b>Y.</b>  | <b>Z.</b>   |
| 1. 880,506.<br>2. 51,709,852.<br>3. 25,590 + 10.<br>4. £2,238. 13s. 2d.<br>5. 13,968 + 16. | 1. 91,761.<br>2. 5,557,384.<br>3. 58,076.<br>4. £14,129. 5s. 6½d.<br>5. 36,000 + 8.         |

## TEST QUESTIONS FOR THIRD CLASS. SET II.

## A2.

1. 502,090.
2. 1,934,722.
3. 15,154,704.
4.  $147,559 + 48$  over.
5.  $5860 + 54$  over.
6. £1249. 17s. 7d.

## C2.

1. 211,156.
2. 5071.
3. 670,218,000.
4.  $11,146 + 10$  over.
5.  $2519 + 356$  over.
6. £567. 2s.  $0\frac{1}{2}$ d.

## E2.

1. 68,595.
2. 23,239,546.
3.  $9866 + 89$  over.
4.  $4460 + 423$  over.
5. 52,936,570.
6. £8196. 0s.  $3\frac{3}{4}$ d.

## G2.

1. 193,343.
2. Thirty thousand and ten.
3. 609,948,944.
4.  $147,204 + 12$  over.
5.  $1000 + 237$  over.
6. £1935. 11s.  $5\frac{1}{4}$ d.

## I2.

1. 286,143.
2. 1,858,271.
3. 6,649,632.
4.  $130,180 + 23$  over.
5. 33,646.
6. £7538. 3s.  $1\frac{1}{2}$ d.

## B2.

1. Seven hundred and four thousand and nine.
2. 272,912.
3. 62,949,333.
4.  $7084 + 25$  over.
5.  $16,142 + 43$  over.
6. £1. 18s. 6d.

## D2.

1. Three hundred and fifty thousand and twenty.
2. 69,709.
3. 723,128,490.
4.  $86,385 + 104$  over.
5.  $1040 + 392$ .
6. £449 2s.  $7\frac{1}{2}$ d.

## F2.

1. 600,002.
2. 979,763.
3. 70,444,118.
4.  $19,832 + 23$  over.
5.  $447 + 152$  over.
6. £725. 13s.  $11\frac{1}{2}$ d.

## H2.

1. One hundred thousand one hundred and one.
2. 919,192.
3. 53,327,661.
4.  $36,024 + 94$  over.
5.  $1015 + 222$  over.
6. £4333. 1s.  $3\frac{3}{4}$ d.

## K2.

1. Five hundred thousand.
2. 9,020,092.
3. 34,523,340.
4.  $108,995 + 64$  over.
5.  $959 + 72$  over.
6. £84,543. 14s. 5d.

## Exercise 23.

|     | <i>£</i>  | <i>s.</i> | <i>d.</i>  |     | <i>£</i>  | <i>s.</i> | <i>d.</i>   |
|-----|-----------|-----------|------------|-----|-----------|-----------|-------------|
| 1.  | 5,410     | 12        | 3 <i>1</i> | 16. | 868,306   | 18        | 7 <i>1</i>  |
| 2.  | 10,945    | 14        | 1 <i>1</i> | 17. | 390,507   | 12        | 10 <i>1</i> |
| 3.  | 16,828    | 13        | 1 <i>1</i> | 18. | 606,229   | 12        | 0 <i>1</i>  |
| 4.  | 4,823     | 19        | 7 <i>1</i> | 19. | 4,318,656 | 11        | 11 <i>1</i> |
| 5.  | 25,299    | 11        | 3 <i>1</i> | 20. | 4,181,468 | 11        | 2 <i>1</i>  |
| 6.  | 1,860,030 | 2         | 0          | 21. | 4,118,782 | 0         | 9 <i>1</i>  |
| 7.  | 1,031,237 | 8         | 5 <i>1</i> | 22. | 8,986     | 0         | 2 <i>1</i>  |
| 8.  | 2,120,917 | 18        | 2 <i>1</i> | 23. | 4,058,222 | 11        | 9 <i>1</i>  |
| 9.  | 404,850   | 3         | 2          | 24. | 1,121,865 | 10        | 6 <i>1</i>  |
| 10. | 2,015,806 | 15        | 4 <i>1</i> | 25. | 1,058,835 | 2         | 2 <i>1</i>  |
| 11. | 1,231,847 | 6         | 0 <i>1</i> | 26. | 1,386,145 | 8         | 3 <i>1</i>  |
| 12. | 1,004,767 | 13        | 0 <i>1</i> | 27. | 2,521,700 | 16        | 9 <i>1</i>  |
| 13. | 63,403    | 2         | 1 <i>1</i> | 28. | 918,682   | 11        | 0 <i>1</i>  |
| 14. | 80,503    | 18        | 1 <i>1</i> | 29. | 90,931    | 3         | 5 <i>1</i>  |
| 15. | 58,531    | 9         | 9 <i>1</i> | 30. | 165,352   | 18        | 10 <i>1</i> |

## Exercise 24.

|     | <i>£</i> | <i>s.</i> | <i>d.</i>   |     | <i>£</i> | <i>s.</i> | <i>d.</i>   |
|-----|----------|-----------|-------------|-----|----------|-----------|-------------|
| 1.  | 71       | 3         | 8           | 25. | 5407     | 6         | 7 <i>1</i>  |
| 2.  | 14       | 8         | 4           | 26. | 938      | 15        | 1 <i>1</i>  |
| 3.  | 78       | 5         | 3           | 27. | 2441     | 19        | 7 <i>1</i>  |
| 4.  | 72       | 9         | 6           | 28. | 297      | 19        | 3 <i>1</i>  |
| 5.  | 34       | 8         | 3           | 29. | 7663     | 16        | 7           |
| 6.  | 59       | 3         | 5           | 30. | 2886     | 19        | 8 <i>1</i>  |
| 7.  | 64       | 7         | 5           | 31. | 486      | 18        | 7 <i>1</i>  |
| 8.  | 35       | 5         | 7           | 32. | 3608     | 6         | 9 <i>1</i>  |
| 9.  | 39       | 4         | 5           | 33. | 18,307   | 6         | 4 <i>1</i>  |
| 10. | 456      | 5         | 1 <i>1</i>  | 34. | 628,409  | 16        | 7 <i>1</i>  |
| 11. | 139      | 6         | 6 <i>1</i>  | 35. | 67,097   | 13        | 5 <i>1</i>  |
| 12. | 153      | 8         | 2 <i>1</i>  | 36. | 14,938   | 10        | 4 <i>1</i>  |
| 13. | 508      | 2         | 5 <i>1</i>  | 37. | 618,893  | 16        | 7 <i>1</i>  |
| 14. | 319      | 13        | 3 <i>1</i>  | 38. | 449,657  | 13        | 11 <i>1</i> |
| 15. | 241      | 4         | 1 <i>1</i>  | 39. | 132,566  | 18        | 2 <i>1</i>  |
| 16. | 758      | 2         | 4 <i>1</i>  | 40. | 44,801   | 18        | 8 <i>1</i>  |
| 17. | 852      | 1         | 5 <i>1</i>  | 41. | 312,703  | 13        | 9 <i>1</i>  |
| 18. | 509      | 10        | 4 <i>1</i>  | 42. | 266,056  | 14        | 7 <i>1</i>  |
| 19. | 441      | 14        | 6 <i>1</i>  | 43. | 90,909   | 9         | 5 <i>1</i>  |
| 20. | 625      | 5         | 8 <i>1</i>  | 44. | 519,209  | 14        | 4 <i>1</i>  |
| 21. | 323      | 12        | 11 <i>1</i> | 45. | 105,294  | 13        | 7 <i>1</i>  |
| 22. | 276      | 0         | 9 <i>1</i>  | 46. | 13,018   | 10        | 3 <i>1</i>  |
| 23. | 369      | 4         | 5 <i>1</i>  | 47. | 728,650  | 13        | 10 <i>1</i> |
| 24. | 2378     | 4         | 6 <i>1</i>  | 48. | 460,553  | 14        | 10 <i>1</i> |

|     | £       | s. | d.  |     | £       | s. | d.  |
|-----|---------|----|-----|-----|---------|----|-----|
| 49. | 132,052 | 18 | 13  | 60. | 15,990  | 16 | 10½ |
| 50. | 34,798  | 18 | 10½ | 61. | 383,712 | 14 | 8½  |
| 51. | 383,308 | 15 | 9½  | 62. | 557,055 | 12 | 5½  |
| 52. | 357,335 | 14 | 8½  | 63. | 91,912  | 9  | 3½  |
| 53. | 180,929 | 9  | 2½  | 64. | 198,033 | 7  | 5½  |
| 54. | 113,389 | 14 | 5½  | 65. | 209,094 | 3  | 3½  |
| 55. | 384,799 | 14 | 8½  | 66. | 60,313  | 12 | 7½  |
| 56. | 10,858  | 10 | 2½  | 67. | 566,844 | 16 | 8½  |
| 57. | 528,740 | 10 | 8½  | 68. | 89,270  | 15 | 10½ |
| 58. | 460,353 | 17 | 0½  | 69. | 619,557 | 6  | 7½  |
| 59. | 143,241 | 18 | 4½  | 70. | 48,147  | 19 | 2½  |

## Exercise 25.

|     | £    | s. | d.  |     | £    | s. | d.  |     | £    | s. | d.  |
|-----|------|----|-----|-----|------|----|-----|-----|------|----|-----|
| 1.  | 9    | 17 | 6   | 11. | 3    | 19 | 11  | 21. | 9999 | 19 | 10½ |
| 2.  | 99   | 10 | 0   | 12. | 44   | 19 | 6½  | 22. | 1    | 0  | 6   |
| 3.  | 2999 | 19 | 8½  | 13. | 99   | 19 | 10½ | 23. | 61   | 2  | 10  |
| 4.  | 299  | 12 | 7½  | 14. | 999  | 0  | 0½  | 24. | 365  | 16 | 10  |
| 5.  | 42   | 10 | 3½  | 15. | 0    | 19 | 11½ | 25. | 0    | 2  | 8½  |
| 6.  | 0    | 10 | 3½  | 16. | 8    | 17 | 6½  | 26. | 1    | 10 | 7½  |
| 7.  | 629  | 19 | 4½  | 17. | 1401 | 12 | 5½  | 27. | 490  | 2  | 5½  |
| 8.  | 999  | 12 | 1½  | 18. | 9    | 10 | 7½  | 28. | 690  | 9  | 7½  |
| 9.  | 59   | 4  | 11½ | 19. | 49   | 2  | 6   | 29. | 9909 | 9  | 11½ |
| 10. | 359  | 19 | 11½ | 20. | 129  | 9  | 6   | 30. | 7084 | 16 | 2½  |

## Exercise 26.

|     | £   | s. | d.  |     | £   | s. | d.  |     | £    | s. | d. |
|-----|-----|----|-----|-----|-----|----|-----|-----|------|----|----|
| 1.  | 68  | 14 | 10½ | 15. | 597 | 15 | 6   | 29. | 217  | 12 | 6½ |
| 2.  | 96  | 10 | 9   | 16. | 268 | 12 | 7½  | 30. | 736  | 11 | 6½ |
| 3.  | 114 | 18 | 6½  | 17. | 473 | 11 | 10½ | 31. | 356  | 4  | 6  |
| 4.  | 36  | 15 | 8½  | 18. | 207 | 9  | 10  | 32. | 225  | 11 | 0  |
| 5.  | 87  | 12 | 4½  | 19. | 629 | 14 | 6   | 33. | 1090 | 19 | 9  |
| 6.  | 219 | 18 | 9½  | 20. | 710 | 5  | 4   | 34. | 562  | 2  | 4½ |
| 7.  | 360 | 18 | 2   | 21. | 343 | 6  | 4   | 35. | 241  | 6  | 2½ |
| 8.  | 144 | 15 | 5   | 22. | 653 | 14 | 11½ | 36. | 231  | 0  | 6  |
| 9.  | 356 | 2  | 7   | 23. | 323 | 7  | 0½  | 37. | 780  | 9  | 9  |
| 10. | 86  | 10 | 11½ | 24. | 805 | 9  | 7½  | 38. | 837  | 15 | 5  |
| 11. | 231 | 17 | 6   | 25. | 178 | 4  | 9½  | 39. | 386  | 6  | 4½ |
| 12. | 62  | 1  | 10½ | 26. | 859 | 6  | 0½  | 40. | 899  | 7  | 9  |
| 13. | 333 | 4  | 4½  | 27. | 505 | 9  | 2   | 41. | 1140 | 4  | 4½ |
| 14. | 441 | 7  | 3   | 28. | 512 | 6  | 11½ |     | 1330 | 5  | 1½ |
|     |     |    |     |     |     |    |     |     | 1520 | 5  | 10 |

|     | £    | s. | d.  |     | £      | s. | d.  |     | £     | s. | d.  |
|-----|------|----|-----|-----|--------|----|-----|-----|-------|----|-----|
| 42. | 6617 | 16 | 3½. | 45. | 1,312  | 7  | 8.  | 48. | 678   | 6  | 8.  |
|     | 7563 | 4  | 4.  |     | 1,476  | 8  | 7½. |     | 775   | 4  |     |
|     | 8508 | 12 | 4½. |     | 1,640  | 9  | 7.  |     | 872   | 2  |     |
| 43. | 275  | 11 | 9.  |     | 1,804  | 10 | 6½. |     | 969   | 0  |     |
|     | 321  | 10 | 4½. | 46. | 5,471  | 11 | 6½. | 49. | 5,767 | 1  |     |
|     | 367  | 9  | 0.  |     | 6,079  | 10 | 7½. |     | 6,407 | 17 |     |
|     | 413  | 7  | 7½. |     | 6,687  | 9  | 8½. |     | 7,048 | 13 |     |
| 44. | 489  | 13 | 1½. |     | 7,295  | 8  | 9.  |     | 7,689 | 8  |     |
|     | 559  | 12 | 2.  | 47. | 8,673  | 12 | 6½. | 50. | 6,928 | 2  |     |
|     | 629  | 11 | 2½. |     | 9,637  | 7  | 3½. |     | 7,697 | 18 |     |
|     | 699  | 10 | 2½. |     | 10,601 | 2  | 0½. |     | 8,467 | 13 | 1½. |
|     |      |    |     |     | 11,564 | 16 | 9.  |     | 9,237 | 9  | 9.  |

## Exercise 27.

|     | £     | s. | d.   |  | £   | s.     | d. |      |
|-----|-------|----|------|--|-----|--------|----|------|
| 1.  | 944   | 15 | 11.  |  | 29. | 6,861  | 16 | 5½.  |
| 2.  | 1,012 | 5  | 7½.  |  | 30. | 7,057  | 17 | 6.   |
| 3.  | 1,079 | 15 | 4.   |  | 31. | 7,548  | 0  | 1¼.  |
| 4.  | 1,214 | 14 | 9.   |  | 32. | 7,842  | 1  | 8.   |
| 5.  | 1,349 | 14 | 2.   |  | 33. | 29,555 | 2  | 6¼.  |
| 6.  | 1,417 | 3  | 10½. |  | 34. | 30,649 | 15 | 3.   |
| 7.  | 1,484 | 13 | 7.   |  | 35. | 32,109 | 5  | 6.   |
| 8.  | 1,619 | 13 | 0.   |  | 36. | 32,839 | 0  | 7½.  |
| 9.  | 2,471 | 6  | 6½.  |  | 37. | 35,028 | 6  | 0.   |
| 10. | 2,669 | 0  | 8½.  |  | 38. | 40,136 | 11 | 10½. |
| 11. | 2,767 | 17 | 9.   |  | 39. | 44,150 | 5  | 0¼.  |
| 12. | 2,965 | 11 | 10½. |  | 40. | 52,542 | 9  | 0.   |
| 13. | 3,163 | 6  | 0.   |  | 41. | 1,251  | 5  | 3½.  |
| 14. | 3,262 | 3  | 0¼.  |  | 42. | 1,340  | 12 | 9¾.  |
| 15. | 3,558 | 14 | 3.   |  | 43. | 1,430  | 0  | 4.   |
| 16. | 3,954 | 2  | 6.   |  | 44. | 1,608  | 15 | 4½.  |
| 17. | 2,981 | 18 | 3.   |  | 45. | 1,787  | 10 | 5.   |
| 18. | 3,123 | 18 | 2.   |  | 46. | 1,876  | 17 | 11¼. |
| 19. | 3,194 | 18 | 1½.  |  | 47. | 1,966  | 5  | 5½.  |
| 20. | 3,407 | 18 | 0.   |  | 48. | 2,145  | 0  | 6.   |
| 21. | 3,549 | 17 | 11.  |  | 49. | 4,197  | 13 | 7½.  |
| 22. | 3,833 | 17 | 9.   |  | 50. | 4,397  | 11 | 5.   |
| 23. | 3,904 | 17 | 8½.  |  | 51. | 4,497  | 10 | 3¾.  |
| 24. | 3,975 | 17 | 8.   |  | 52. | 4,797  | 7  | 0.   |
| 25. | 5,881 | 11 | 3.   |  | 53. | 5,997  | 4  | 9½.  |
| 26. | 6,175 | 12 | 9¼.  |  | 54. | 5,397  | 0  | 4½.  |
| 27. | 6,273 | 13 | 4.   |  | 55. | 5,496  | 19 | 3¾.  |
| 28. | 6,469 | 14 | 4½.  |  | 56. | 5,596  | 18 | 2.   |

|     | <i>£</i> | <i>s.</i> | <i>d.</i>                 |     | <i>£</i> | <i>s.</i> | <i>d.</i>                  |
|-----|----------|-----------|---------------------------|-----|----------|-----------|----------------------------|
| 57. | 5,205    | 1         | 3.                        | 77. | 2,460    | 16        | 8.                         |
| 58. | 5,465    | 6         | 3 <i>1</i> <sub>2</sub> . | 78. | 2,537    | 14        | 8 <i>1</i> <sub>2</sub> .  |
| 59. | 5,552    | 1         | 4.                        | 79. | 2,768    | 8         | 9.                         |
| 60. | 5,725    | 11        | 4 <i>1</i> <sub>2</sub> . | 80. | 3,076    | 0         | 10.                        |
| 61. | 6,072    | 11        | 5 <i>1</i> <sub>2</sub> . | 81. | 4,182    | 3         | 9.                         |
| 62. | 6,246    | 1         | 6.                        | 82. | 4,391    | 5         | 11 <i>1</i> <sub>2</sub> . |
| 63. | 6,679    | 16        | 7 <i>1</i> <sub>2</sub> . | 83. | 4,461    | 0         | 0.                         |
| 64. | 6,940    | 1         | 8.                        | 84. | 4,600    | 8         | 1 <i>1</i> <sub>2</sub> .  |
| 65. | 62,284   | 2         | 1 <i>1</i> <sub>2</sub> . | 85. | 4,879    | 4         | 4 <i>1</i> <sub>2</sub> .  |
| 66. | 64,590   | 18        | 6.                        | 86. | 5,018    | 12        | 6.                         |
| 67. | 67,666   | 13        | 8.                        | 87. | 5,367    | 2         | 9 <i>1</i> <sub>2</sub> .  |
| 68. | 69,204   | 11        | 3.                        | 88. | 5,576    | 5         | 0.                         |
| 69. | 73,818   | 4         | 0.                        | 89. | 78,405   | 9         | 4 <i>1</i> <sub>2</sub> .  |
| 70. | 84,583   | 7         | 1.                        | 90. | 81,309   | 7         | 6.                         |
| 71. | 93,041   | 13        | 9 <i>1</i> <sub>2</sub> . | 91. | 85,181   | 5         | 0.                         |
| 72. | 110,727  | 6         | 0.                        | 92. | 87,117   | 3         | 9.                         |
| 73. | 1,922    | 10        | 6 <i>1</i> <sub>2</sub> . | 93. | 92,925   | 0         | 0.                         |
| 74. | 2,076    | 6         | 6 <i>1</i> <sub>2</sub> . | 94. | 106,476  | 11        | 3.                         |
| 75. | 2,153    | 4         | 7.                        | 95. | 117,124  | 4         | 4.                         |
| 76. | 2,307    | 0         | 7 <i>1</i> <sub>2</sub> . | 96. | 139,387  | 10        | 0.                         |

## Exercise 28.

|     | <i>£</i> | <i>s.</i> | <i>d.</i>                  |     | <i>£</i> | <i>s.</i> | <i>d.</i>                  |
|-----|----------|-----------|----------------------------|-----|----------|-----------|----------------------------|
| 1.  | 1,228    | 17        | 10 <i>1</i> <sub>2</sub> . | 22. | 3,056    | 8         | 10 <i>1</i> <sub>2</sub> . |
| 2.  | 2,438    | 14        | 6 <i>1</i> <sub>2</sub> .  | 23. | 22,352   | 14        | 0 <i>1</i> <sub>2</sub> .  |
| 3.  | 11,975   | 12        | 9 <i>1</i> <sub>2</sub> .  | 24. | 34,163   | 15        | 1 <i>1</i> <sub>2</sub> .  |
| 4.  | 1,049    | 7         | 4.                         | 25. | 45,287   | 12        | 11.                        |
| 5.  | 12,075   | 7         | 3 <i>1</i> <sub>2</sub> .  | 26. | 34,535   | 6         | 2 <i>1</i> <sub>2</sub> .  |
| 6.  | 4,027    | 18        | 6 <i>1</i> <sub>2</sub> .  | 27. | 3,459    | 11        | 8.                         |
| 7.  | 807      | 7         | 3.                         | 28. | 9,661    | 16        | 0 <i>1</i> <sub>2</sub> .  |
| 8.  | 5,682    | 17        | 9 <i>1</i> <sub>2</sub> .  | 29. | 28,296   | 18        | 10 <i>1</i> <sub>2</sub> . |
| 9.  | 14,015   | 18        | 0.                         | 30. | 18,483   | 4         | 7 <i>1</i> <sub>2</sub> .  |
| 10. | 9,057    | 10        | 7.                         | 31. | 3,214    | 0         | 6 <i>1</i> <sub>2</sub> .  |
| 11. | 11,814   | 14        | 2 <i>1</i> <sub>2</sub> .  | 32. | 11,322   | 13        | 2 <i>1</i> <sub>2</sub> .  |
| 12. | 509      | 16        | 8.                         | 33. | 29,539   | 18        | 3 <i>1</i> <sub>2</sub> .  |
| 13. | 4,997    | 9         | 8 <i>1</i> <sub>2</sub> .  | 34. | 1,508    | 9         | 3 <i>1</i> <sub>2</sub> .  |
| 14. | 12,236   | 10        | 4.                         | 35. | 27,702   | 6         | 2 <i>1</i> <sub>2</sub> .  |
| 15. | 4,553    | 16        | 9 <i>1</i> <sub>2</sub> .  | 36. | 7,126    | 6         | 8 <i>1</i> <sub>2</sub> .  |
| 16. | 2,174    | 3         | 10 <i>1</i> <sub>2</sub> . | 37. | 3,748    | 9         | 4 <i>1</i> <sub>2</sub> .  |
| 17. | 7,490    | 7         | 6 <i>1</i> <sub>2</sub> .  | 38. | 12,881   | 4         | 4 <i>1</i> <sub>2</sub> .  |
| 18. | 36,725   | 5         | 11 <i>1</i> <sub>2</sub> . | 39. | 76,211   | 9         | 1 <i>1</i> <sub>2</sub> .  |
| 19. | 4,394    | 4         | 5 <i>1</i> <sub>2</sub> .  | 40. | 24,508   | 12        | 2.                         |
| 20. | 61,797   | 9         | 2 <i>1</i> <sub>2</sub> .  | 41. | 33,626   | 0         | 8 <i>1</i> <sub>2</sub> .  |
| 21. | 11,464   | 2         | 0 <i>1</i> <sub>2</sub> .  | 42. | 1,930    | 1         | 8.                         |

|     | <i>s.</i> | <i>d.</i> |             | <i>s.</i> | <i>d.</i> |    |             |
|-----|-----------|-----------|-------------|-----------|-----------|----|-------------|
| 43. | 11,344    | 12        | 7 <i>1</i>  | 87.       | 14,468    | 12 | 2 <i>1</i>  |
| 44. | 45,122    | 3         | 1 <i>4</i>  | 88.       | 14,759    | 0  | 2 <i>1</i>  |
| 45. | 12,322    | 3         | 1.          | 89.       | 13,829    | 15 | 2 <i>4</i>  |
| 46. | 57,286    | 13        | 8 <i>1</i>  | 90.       | 45,411    | 0  | 2.          |
| 47. | 86,396    | 3         | 10 <i>4</i> | 91.       | 40,432    | 15 | 7 <i>1</i>  |
| 48. | 76,956    | 5         | 1 <i>4</i>  | 92.       | 7,125     | 5  | 8 <i>4</i>  |
| 49. | 41,741    | 19        | 7 <i>1</i>  | 93.       | 459,280   | 9  | 5 <i>4</i>  |
| 50. | 60,659    | 12        | 8 <i>4</i>  | 94.       | 192,565   | 8  | 1 <i>4</i>  |
| 51. | 99,710    | 17        | 1.          | 95.       | 99,807    | 13 | 8 <i>4</i>  |
| 52. | 106,853   | 7         | 4 <i>1</i>  | 96.       | 3,654     | 15 | 5 <i>4</i>  |
| 53. | 83,270    | 15        | 2 <i>4</i>  | 97.       | 13,574    | 7  | 0.          |
| 54. | 96,874    | 6         | 10 <i>4</i> | 98.       | 89,849    | 10 | 1 <i>4</i>  |
| 55. | 105,811   | 1         | 4 <i>1</i>  | 99.       | 34,885    | 8  | 6.          |
| 56. | 2,919     | 1         | 5 <i>4</i>  | 100.      | 23,686    | 16 | 6.          |
| 57. | 11,905    | 19        | 11 <i>4</i> | 101.      | 67,181    | 7  | 11 <i>4</i> |
| 58. | 14,594    | 12        | 3.          | 102.      | 33,844    | 14 | 8 <i>4</i>  |
| 59. | 19,661    | 6         | 0 <i>4</i>  | 103.      | 178,462   | 16 | 3.          |
| 60. | 30,490    | 9         | 9.          | 104.      | 424,041   | 17 | 6.          |
| 61. | 67,510    | 3         | 6 <i>4</i>  | 105.      | 805,322   | 16 | 3.          |
| 62. | 63,395    | 3         | 9 <i>4</i>  | 106.      | 79,427    | 10 | 1 <i>4</i>  |
| 63. | 427,925   | 18        | 11 <i>4</i> | 107.      | 32,017    | 4  | 2 <i>2</i>  |
| 64. | 439,238   | 10        | 7 <i>4</i>  | 108.      | 15,274    | 8  | 9.          |
| 65. | 214,460   | 5         | 9.          | 109.      | 11,303    | 18 | 1 <i>1</i>  |
| 66. | 9,087     | 15        | 6 <i>4</i>  | 110.      | 49,192    | 19 | 4 <i>4</i>  |
| 67. | 13,767    | 2         | 0 <i>4</i>  | 111.      | 224,243   | 2  | 11.         |
| 68. | 16,151    | 7         | 4 <i>4</i>  | 112.      | 450,030   | 4  | 2.          |
| 69. | 9,136     | 17        | 8 <i>4</i>  | 113.      | 594,779   | 3  | 4.          |
| 70. | 38,695    | 5         | 11.         | 114.      | 30,706    | 8  | 1 <i>4</i>  |
| 71. | 35,945    | 11        | 0 <i>4</i>  | 115.      | 175,448   | 8  | 2 <i>4</i>  |
| 72. | 28,599    | 12        | 11 <i>4</i> | 116.      | 567,017   | 10 | 0.          |
| 73. | 599,341   | 6         | 3 <i>4</i>  | 117.      | 438,770   | 13 | 11 <i>4</i> |
| 74. | 253,074   | 5         | 7 <i>4</i>  | 118.      | 34,141    | 6  | 7 <i>4</i>  |
| 75. | 214,456   | 13        | 3 <i>4</i>  | 119.      | 1,116,153 | 3  | 2.          |
| 76. | 3,512     | 7         | 7.          | 120.      | 517,539   | 3  | 3 <i>4</i>  |
| 77. | 12,512    | 13        | 5 <i>4</i>  | 121.      | 11        | 11 | 0.          |
| 78. | 13,168    | 14        | 0 <i>4</i>  | 122.      | 12,520    | 1  | 8.          |
| 79. | 29,759    | 14        | 3 <i>4</i>  | 123.      | 263       | 16 | 4 <i>4</i>  |
| 80. | 35,782    | 4         | 6.          | 124.      | 1,495     | 14 | 6.          |
| 81. | 75,971    | 9         | 9 <i>4</i>  | 125.      | 4,087     | 6  | 2.          |
| 82. | 15,794    | 4         | 2 <i>4</i>  | 126.      | 29,172    | 0  | 0.          |
| 83. | 327,909   | 2         | 1.          | 127.      | 251       | 4  | 3.          |
| 84. | 334,218   | 13        | 1 <i>4</i>  | 128.      | 379       | 8  | 11 <i>2</i> |
| 85. | 99,809    | 7         | 4 <i>2</i>  | 129.      | 21        | 0  | 0.          |
| 86. | 10,934    | 17        | 9           | 130.      | 283       | 10 | 0.          |

## Exercise 29.

|     | £    | s. | d.                           |     | £    | s. | d.                   |
|-----|------|----|------------------------------|-----|------|----|----------------------|
| 1.  | 39   | 9  | 5 $\frac{1}{2}$ .            | 37. | 161  | 17 | 6 $\frac{1}{4}$ .    |
| 2.  | 21   | 6  | 4 $\frac{5}{8}$ .            | 38. | 134  | 17 | 11 $\frac{1}{2}$ +4. |
| 3.  | 7    | 12 | 3 $\frac{3}{4}$ .            | 39. | 115  | 12 | 6 $\frac{1}{4}$ +3.  |
| 4.  | 31   | 5  | 2 $\frac{1}{4}$ .            | 40. | 317  | 14 | 8 $\frac{3}{4}$ +2.  |
| 5.  | 26   | 4  | 10.                          | 41. | 272  | 6  | 10 $\frac{3}{4}$ +1. |
| 6.  | 14   | 8  | 1 $\frac{1}{2}$ .            | 42. | 238  | 6  | 0 $\frac{1}{4}$ +6.  |
| 7.  | 21   | 4  | 2.                           | 43. | 1135 | 12 | 2 $\frac{1}{2}$ +3.  |
| 8.  | 8    | 3  | 7.                           | 44. | 1009 | 8  | 7 $\frac{1}{2}$ +5.  |
| 9.  | 4    | 15 | 6 $\frac{1}{2}$ .            | 45. | 908  | 9  | 9 $\frac{1}{4}$ +1.  |
| 10. | 15   | 2  | 2.                           | 46. | 809  | 7  | 4 $\frac{1}{4}$ +4.  |
| 11. | 18   | 3  | 8.                           | 47. | 735  | 15 | 9 $\frac{1}{4}$ +5.  |
| 12. | 4    | 14 | 6 $\frac{1}{4}$ .            | 48. | 674  | 9  | 6 + 2.               |
| 13. | 121  | 3  | 1.                           | 49. | 121  | 9  | 9 + 2.               |
| 14. | 28   | 2  | 7.                           | 50. | 101  | 4  | 9 $\frac{1}{2}$ +2.  |
| 15. | 68   | 10 | 5 $\frac{1}{2}$ .            | 51. | 86   | 15 | 6 $\frac{1}{2}$ .    |
| 16. | 52   | 1  | 2.                           | 52. | 284  | 18 | 2 $\frac{1}{2}$ +1.  |
| 17. | 115  | 2  | 4.                           | 53. | 244  | 4  | 2 + 5.               |
| 18. | 71   | 4  | 3 $\frac{1}{4}$ .            | 54. | 213  | 13 | 7 $\frac{1}{4}$ +5.  |
| 19. | 114  | 2  | 2 $\frac{1}{4}$ .            | 55. | 761  | 17 | 4 + 7.               |
| 20. | 18   | 6  | 2.                           | 56. | 677  | 4  | 3 $\frac{1}{4}$ .    |
| 21. | 38   | 19 | 6 $\frac{1}{3}\frac{1}{2}$ . | 57. | 609  | 9  | 10 $\frac{1}{2}$ +3. |
| 22. | 73   | 3  | 2.                           | 58. | 9083 | 15 | 6 + 1.               |
| 23. | 78   | 17 | 1 $\frac{1}{2}$ +4.          | 59. | 8257 | 19 | 6 $\frac{1}{2}$ +3.  |
| 24. | 30   | 13 | 5 $\frac{1}{4}$ +1.          | 60. | 7569 | 16 | 3 + 1.               |
| 25. | 438  | 14 | 7 $\frac{1}{2}$ +8.          | 61. | 161  | 9  | 11 $\frac{1}{4}$ +1. |
| 26. | 200  | 9  | 0 $\frac{1}{4}$ .            | 62. | 134  | 11 | 7 $\frac{1}{4}$ +4.  |
| 27. | 846  | 0  | 5.                           | 63. | 115  | 7  | 1 + 6.               |
| 28. | 804  | 0  | 6.                           | 64. | 317  | 14 | 8 $\frac{3}{4}$ +3.  |
| 29. | 288  | 12 | 6 $\frac{3}{4}$ +1.          | 65. | 272  | 6  | 11 + 1.              |
| 30. | 671  | 9  | 2.                           | 66. | 238  | 6  | 0 $\frac{1}{2}$ +5.  |
| 31. | 311  | 1  | 6 $\frac{1}{4}$ .            | 67. | 1135 | 12 | 0 $\frac{1}{4}$ +7.  |
| 32. | 83   | 7  | 0 $\frac{1}{4}$ +1.          | 68. | 1009 | 8  | 6 + 7.               |
| 33. | 750  | 15 | 10 $\frac{1}{4}$ .           | 69. | 908  | 9  | 7 $\frac{1}{4}$ +9.  |
| 34. | 4038 | 4  | 8 $\frac{1}{4}$ +1.          | 70. | 7093 | 15 | 6 + 1.               |
| 35. | 2692 | 3  | 1 $\frac{1}{2}$ +1.          | 71. | 6448 | 17 | 8 $\frac{3}{4}$ .    |
| 36. | 2019 | 2  | 4.                           | 72. | 5911 | 9  | 7 + 1.               |

## Exercise 30.

|    | £   | s. | d.  |    | £   | s. | d. |
|----|-----|----|-----|----|-----|----|----|
| 1. | 840 | 10 | 11. | 3. | 456 | 13 | 2. |
| 2. | 209 | 17 | 6.  | 4. | 976 | 14 | 9. |

|     | £      | s. | d.                  |     | £      | s. | d.                 |
|-----|--------|----|---------------------|-----|--------|----|--------------------|
| 5.  | 308    | 9  | 10.                 | 18. | 170    | 6  | 8.                 |
| 6.  | 756    | 15 | 8.                  | 19. | 18     | 19 | 8 <i>1</i> .       |
| 7.  | 3,086  | 0  | 7 <i>1</i> .        | 20. | 7,086  | 17 | 0 <i>1</i> nearly. |
| 8.  | 7,024  | 18 | 4 <i>1</i> .        | 21. | 89,004 | 9  | 9 <i>1</i> .       |
| 9.  | 87,979 | 15 | 3 <i>1</i> .        | 22. | 8,088  | 11 | 9.                 |
| 10. | 59,810 | 9  | 6 <i>1</i> .        | 23. | 9,840  | 14 | 3 <i>1</i> .       |
| 11. | 906    | 9  | 2 <i>1</i> .        | 24. | 75,820 | 0  | 9 <i>1</i> .       |
| 12. | 47     | 15 | 8 <i>1</i> .        | 25. | 64,320 | 16 | 8 <i>1</i> .       |
| 13. | 13,047 | 2  | 4 <i>1</i> .        | 26. | 4,801  | 12 | 8.                 |
| 14. | 3,401  | 19 | 10.                 | 27. | 1,252  | 2  | 10 <i>1</i> .      |
| 15. | 7,089  | 14 | 5 <i>1</i> .        | 28. | 6,607  | 11 | 4 <i>1</i> .       |
| 16. | 1,408  | 17 | 5 <i>1</i> .        | 29. | 90,064 | 7  | 10 <i>1</i> .      |
| 17. | 8,195  | 19 | 11 <i>1</i> nearly. | 30. | 72,057 | 18 | 0 <i>1</i> .       |

## Exercise 31.

|     | £   | s. | d.              |     | £    | s. | d.                           |
|-----|-----|----|-----------------|-----|------|----|------------------------------|
| 1.  | 14  | 10 | 0.              | 28. | 1007 | 9  | 2 <i>1</i> <sup>2</sup> +25. |
| 2.  | 36  | 3  | 0.              | 29. | 42   | 3  | 1 <i>1</i> <sup>2</sup> +92. |
| 3.  | 37  | 3  | 0.              | 30. | 63   | 15 | 8.                           |
| 4.  | 72  | 7  | 0.              | 31. | 52   | 14 | 6 <i>1</i> .                 |
| 5.  | 54  | 11 | 0.              | 32. | 0    | 17 | 7 <i>1</i> .                 |
| 6.  | 29  | 13 | 0.              | 33. | 49   | 12 | 7 <i>1</i> .                 |
| 7.  | 37  | 4  | 0.              | 34. | 57   | 13 | 8 <i>1</i> .                 |
| 8.  | 49  | 10 | 0.              | 35. | 75   | 18 | 3 <i>1</i> .                 |
| 9.  | 84  | 15 | 0.              | 36. | 82   | 17 | 4 <i>1</i> .                 |
| 10. | 47  | 8  | 0.              | 37. | 18   | 11 | 5 <i>1</i> .                 |
| 11. | 38  | 12 | 0.              | 38. | 26   | 17 | 5 <i>1</i> .                 |
| 12. | 87  | 14 | 0.              | 39. | 63   | 17 | 5 <i>1</i> .                 |
| 13. | 24  | 9  | 0.              | 40. | 91   | 17 | 4 <i>1</i> .                 |
| 14. | 84  | 6  | 0.              | 41. | 32   | 19 | 4 <i>1</i> .                 |
| 15. | 32  | 10 | 0.              | 42. | 56   | 16 | 8 <i>1</i> .                 |
| 16. | 69  | 17 | 0.              | 43. | 81   | 16 | 4 <i>1</i> .                 |
| 17. | 46  | 8  | 6 <i>1</i> .    | 44. | 47   | 16 | 5 <i>1</i> .                 |
| 18. | 46  | 8  | 5 <i>1</i> .    | 45. | 48   | 12 | 9 <i>1</i> .                 |
| 19. | 83  | 7  | 9 <i>1</i> .    | 46. | 53   | 14 | 7 <i>1</i> .                 |
| 20. | 55  | 9  | 8 <i>1</i> .    | 47. | 37   | 16 | 8 <i>1</i> .                 |
| 21. | 13  | 14 | 8 <i>1</i> +1.  | 48. | 73   | 18 | 5 <i>1</i> .                 |
| 22. | 4   | 4  | 7 <i>1</i> .    | 49. | 48   | 13 | 6 <i>1</i> .                 |
| 23. | 568 | 1  | 3 <i>1</i> +23. | 50. | 83   | 16 | 4 <i>1</i> .                 |
| 24. | 94  | 1  | 7 <i>1</i> .    | 51. | 19   | 16 | 6 <i>1</i> .                 |
| 25. | 54  | 8  | 7 <i>1</i> .    | 52. | 86   | 15 | 8 <i>1</i> .                 |
| 26. | 72  | 9  | 8 <i>1</i> .    | 53. | 85   | 14 | 7 <i>1</i> .                 |
| 27. | 101 | 6  | 5 <i>1</i> +5.  | 54. | 95   | 12 | 8 <i>1</i> .                 |

|     | £     | s. | d.                 |      | £       | s. | d.                 |
|-----|-------|----|--------------------|------|---------|----|--------------------|
| 55. | 51    | 16 | 7 <i>1</i>         | 88.  | 122     | 19 | 4 <i>1</i> + 292.  |
| 56. | 58    | 17 | 4 <i>1</i>         | 89.  | 82      | 7  | 0 + 358.           |
| 57. | 26    | 17 | 8 <i>1</i>         | 90.  | 140     | 6  | 0 <i>1</i> + 14.   |
| 58. | 63    | 6  | 10 <i>1</i>        | 91.  | 1,537   | 3  | 4 <i>1</i> + 911.  |
| 59. | 0     | 3  | 9 <i>1</i> + 58.   | 92.  | 4,399   | 5  | 2 <i>1</i> + 4299. |
| 60. | 0     | 16 | 7 <i>1</i>         | 93.  | 229,485 | 14 | 7 <i>1</i> + 49.   |
| 61. | 744   | 3  | 1 <i>1</i>         | 94.  | 991     | 7  | 6 <i>1</i> + 6496. |
| 62. | 0     | 19 | 9 <i>1</i>         | 95.  | 5,621   | 3  | 1 <i>1</i> + 1875. |
| 63. | 85    | 16 | 4 <i>1</i>         | 96.  | 142,656 | 2  | 2 <i>1</i> + 4136. |
| 64. | 319   | 18 | 5 <i>1</i>         | 97.  | 778     | 1  | 1 + 409.           |
| 65. | 0     | 19 | 11 <i>1</i>        | 98.  | 15,740  | 17 | 2 <i>1</i> + 2604. |
| 66. | 402   | 13 | 0 <i>1</i> + 836.  | 99.  | 248,555 | 0  | 8 <i>1</i> + 641.  |
| 67. | 55    | 0  | 4 + 126.           | 100. | 458,971 | 9  | 2 + 49.            |
| 68. | 0     | 3  | 4.                 | 101. | 0       | 15 | 10.                |
| 69. | 687   | 12 | 4 <i>1</i>         | 102. | 48      | 7  | 4 <i>1</i> .       |
| 70. | 509   | 13 | 11 <i>1</i>        | 103. | 1       | 17 | 0.                 |
| 71. | 79    | 13 | 10 <i>1</i>        | 104. | 0       | 2  | 7 <i>1</i> .       |
| 72. | 0     | 15 | 11 <i>1</i> + 67.  | 105. | 13      | 14 | 6 <i>1</i> .       |
| 73. | 162   | 5  | 11 + 19.           | 106. | 0       | 5  | 9.                 |
| 74. | 4,894 | 18 | 10 + 435.          | 107. | 0       | 3  | 4.                 |
| 75. | 0     | 18 | 6 <i>1</i>         | 108. | 0       | 19 | 9 <i>1</i> .       |
| 76. | 379   | 17 | 11 <i>1</i>        | 109. | 1       | 19 | 5 <i>1</i> .       |
| 77. | 809   | 16 | 5 <i>1</i>         | 110. | 0       | 1  | 10 <i>1</i> .      |
| 78. | 0     | 19 | 11 <i>1</i> + 504. | 111. | 9       | 6  | 9 + 2.             |
| 79. | 11    | 1  | 0 + 430.           | 112. | 21      | 5  | 8 <i>1</i> + 2.    |
| 80. | 14    | 3  | 5 <i>1</i> + 72.   | 113. | 4       | 16 | 10 <i>1</i> + 2.   |
| 81. | 7     | 14 | 11 + 126.          | 114. | 5       | 1  | 10 + 7.            |
| 82. | 428   | 13 | 8 <i>1</i> .       | 115. | 6       | 8  | 4 + 1.             |
| 83. | 329   | 4  | 3 <i>1</i> + 274.  | 116. | 72      | 14 | 6 <i>1</i> + 2.    |
| 84. | 137   | 5  | 7 + 368.           | 117. | 12      | 8  | 1 <i>1</i> .       |
| 85. | 132   | 4  | 3 <i>1</i> + 200.  | 118. | 1       | 18 | 1 <i>1</i> + 48.   |
| 86. | 69    | 14 | 7 <i>1</i> + 459.  | 119. | 1,100   | 11 | 9 <i>1</i> .       |
| 87. | 132   | 12 | 9 <i>1</i> + 139.  | 120. | 11,734  | 5  | 1 + 30.            |

## Exercise 32.

- |    |                |     |                |
|----|----------------|-----|----------------|
| 1. | 25 farthings.  | 9.  | 357 shillings. |
| 2. | 275 "          | 10. | 140 "          |
| 3. | 17 "           | 11. | 310 "          |
| 4. | 321 "          | 12. | 336 "          |
| 5. | 33 "           | 13. | 1302 pence.    |
| 6. | 317 "          | 14. | 1791 "         |
| 7. | 120 shillings. | 15. | 1532 "         |
| 8. | 370 "          | 16. | 399 shillings. |

17. 6129 farthings.  
 18. 8869 halfpence.  
 19. 7949 farthings.  
 20. 8363 halfpence.  
 21. 7085 farthings.  
 22. 7881 halfpence.  
 23. 3783 farthings.  
 24. 214 pence.  
 25. 333 farthinga.  
 26. 644 pence.  
 27. 4131 "  
 28. 16,523 "  
 29. 37,652 "  
 30. 61,603 "  
 31. 154,494 "  
 32. 374 farthinga.  
 33. 17,057 "  
 34. 19,105 halfpence.  
 35. 400 threepences.  
 36. 1463 "  
 37. 142,272 farthinga.  
 38. 31,740 halfpence.  
 39. 115,668 "  
 40. 1560 sixpences.  
 41. 179,040 halfpence.  
 42. 633 sixpences.  
 43. 48,216 threepences.  
 44. 27,671 farthings.  
 45. 35,393 halfpence.  
 46. 616 threepences.  
 47. 3990 "  
 48. 71,316 "  
 49. 32,736 farthings.  
 50. 26,220 halfpence.  
 51. 133,056 halfpence.  
 52. 4950 sixpences.  
 53. 125,760 halfpence.  
 54. 1955 sixpences.  
 55. 463,163 halfpence.  
 56. 699,216 farthings.  
 57. 598,440 pence.  
 58. 898,125 fourpenny pieces.  
 59. 244,815 sixpences.  
 60. 494,212 fourpenny pieces.
61. 2,324,232 farthinga.  
 62. 96,489 florins.  
 63. 738,612 threepences.  
 64. 199,475 sixpences.  
 65. 334,975 halfpence.  
 66. 749,664 farthinga.  
 67. 766,200 pence.  
 68. 809,640 fourpenny pieces.  
 69. 198,825 sixpences.  
 70. 560,756 fourpenny pieces.  
 71. 1,894,416 farthinga.  
 72. 64,987 florins.  
 73. 821,772 threepences.  
 74. 227,197 sixpences.  
 75. 323,937 halfpence.  
 76. 479,424 farthinga.  
 77. 596,040 pence.  
 78. 1,190,310 fourpenny pieces.  
 79. 474,315 sixpences.  
 80. 554,212 fourpenny pieces.  
 81. 1,916,232 farthinga.  
 82. 69,486 florins.  
 83. 829,332 threepences.  
 84. 183,587 sixpences.  
 85. 4,683,840 farthinga.  
 86. 4,857,552 halfpence.  
 87. 2,226,240 farthinga.  
 88. 5,728,320 "  
 89. 3,060,480 "  
 90. 2,215,584 halfpence.  
 91. 718,440 "  
 92. 652,560 farthinga.  
 93. 239,376 halfpence.  
 94. 556,680 "  
 95. 560,640 farthinga.  
 96. 258,960 halfpence.  
 97. 13,981 "  
 98. 54 half-crowns.  
 99. 810 half-guineas.  
 100. 4347 sixpences.

## Exercise 33.

| £      | s. | d.   |                                 |
|--------|----|------|---------------------------------|
| 33     | 18 | 0.   | 31. 1662 half-sovs. 4s. 4d.     |
| 892    | 13 | 0.   | 32. 1305 half-crowns 1s. 11½d.  |
| 28     | 14 | 6.   | 33. 9223 guineas 14s.           |
| 67     | 9  | 4½.  | 34. 391 crowns 3s. 6d.          |
| 61     | 16 | 11½. | 35. 3282 half-crowns 1s. 1d.    |
| 144    | 15 | 1½.  | 36. 24,210 half-sovs. 7s. 6d.   |
| 28     | 16 | 0.   | 37. 39 half-guineas 1s. 11d.    |
| 789    | 3  | 0.   | 38. 979 half-sovereigns 1s. 8d. |
| 19     | 10 | 9.   | 39. 1488 half-crowns 1s. 0½d.   |
| 67     | 11 | 6½.  | 40. 6999 guineas 15s.           |
| 132    | 4  | 11½. | 41. 234 crowns 4s. 6d.          |
| 61     | 17 | 2½.  | 42. 2159 half-crowns 1s. 11d.   |
| 28     | 4  | 0.   | 43. 11,599 half-sovereigns 5s.  |
| 993    | 15 | 0.   | 44. 34 half-guineas 7s. 10d.    |
| 39     | 10 | 6.   | 45. 1979 half-sovs. 1s. 8d.     |
| 57     | 3  | 3½.  | 46. 6618 guineas.               |
| 72     | 12 | 10.  | 47. 243 crowns 4s.              |
| 118    | 9  | 11½. | 48. 1566 half-crowns 7d.        |
| 2,993  | 13 | 0.   | 49. 16,222 half-sovs. 7s. 6d.   |
| 6,785  | 8  | 0.   | 50. 19 half-guineas 8s. 3d.     |
| 6,234  | 10 | 0.   | 51. 65 shillings 6½d.           |
| 14,845 | 10 | 0.   | 52. £131. 4s. 6d.               |
| 1,244  | 4  | 6.   | 53. 246 shillings.              |
| 989    | 15 | 8.   | 54. 1141 florins 1s.            |
| 856    | 3  | 3.   | 55. 14 guineas 15s. 8d.         |
| 411    | 6  | 11.  | 56. 19 half-guineas 9s. 2d.     |
| 124    | 14 | 4½.  | 57. £41. 2s.                    |
| 40     | 18 | 8½.  | 58. 407 half-sovs. 7s. 8d.      |
| 617    | 2  | 9.   | 59. 1862 half-guineas 8s. 9d.   |
| 997    | 19 | 8.   | 60. 490 half-crowns 2s. 4d.     |

## Exercise 34.

|                             |                              |
|-----------------------------|------------------------------|
| £109. 5s. 6d.               | 10. 49,184 crowns 6d.        |
| 859 florins 6d.             | 11. 84 half-crowns.          |
| 17 guineas 20s. 10d.        | 12. 335 guineas.             |
| 13 half-guineas 10s. 2d.    | 13. 3506 guineas 14s.        |
| £67. 4s. 6½d.               | 14. 3162 half-crowns 1s. 6d. |
| 307 half-sovereigns 8s. 9d. | 15. 120,317 crowns 2s.       |
| 2072 half-guineas 10s.      | 16. 126 half-crowns.         |
| 778 half-crowns 2s. 0½d.    | 17. 442 guineas 20s. 6d.     |
| 1915 half-crowns 6d.        | 18. 7495 guineas.            |

|                                  |                          |
|----------------------------------|--------------------------|
| 19. £8673. 4s.                   | 25. £17,235. 15s.        |
| 20. £7467. 5s.                   | 26. £982. 3s. 6d.        |
| 21. £21,184.                     | 27. 7480 florins.        |
| 22. £1494. 16s. 6d.              | 28. 269 guineas 16s. 3d. |
| 23. £6739. 8s.                   | 29. 6232 florins 1s.     |
| 24. £6232.                       | 30. 150 guineas 15s. 6d. |
| 31. 144,730 fourpenny pieces 2d. |                          |
| 32. £20,797. 7s.                 |                          |
| 33. 15,792 farthings.            |                          |
| 34. 85,428 pence.                |                          |
| 35. 27,720 farthings.            |                          |
| 36. 9,932 florins 1s.            |                          |
| 37. 382 guineas 10s. 3d.         |                          |
| 38. 104,809 fourpenny pieces 2d. |                          |
| 39. £31,194. 9s.                 |                          |
| 40. 11,024 farthings.            |                          |
| 41. 72,324 pence.                |                          |
| 42. 19,656 farthings.            |                          |
| 43. 973 half-crowns 8½d.         |                          |
| 44. 112,474 fourpenny pieces 2d. |                          |
| 45. £18,273. 3s.                 | 58. £11,025.             |
| 46. 9328 farthings.              | 59. 960 farthings.       |
| 47. 100,296 pence.               | 60. 1144 times.          |
| 48. 33,768 farthings.            | 61. 60 times.            |
| 49. £170. 5s.                    | 62. 934 slates.          |
| 50. 2000 crowns.                 | 63. 400 yards.           |
| 51. 27,320 sixpences.            | 64. 131 lbs.             |
| 52. £4371. 13s. 6d.              | 65. 18,642.              |
| 53. £14. 18s. 3d.                | 66. 121.                 |
| 54. 10 guineas 14s. 11d.         | 67. 215,040.             |
| 55. £8. 13s. 9½d.                | 68. £8. 6s. 8d.          |
| 56. 5453 half-crowns.            | 69. £61. 9s. 2d.         |
| 57. £158. 6s. 10½d.              | 70. 2244.                |

## Exercise 35.

|                   |                    |
|-------------------|--------------------|
| 1. 1580 cwts.     | 9. 2880 stones.    |
| 2. 1872 quarters. | 10. 3360 ounces.   |
| 3. 8632 lbs.      | 11. 96,320 lbs.    |
| 4. 2960 quarters. | 12. 917,504 drams. |
| 5. 9216 drams.    | 13. 86,016 drams.  |
| 6. 6720 ounces.   | 14. 35,840 drams.  |
| 7. 23,296 ounces. | 15. 215 drams.     |
| 8. 3200 quarters. | 16. 227 ounces.    |

- |                                    |  |
|------------------------------------|--|
| 519 drams.                         | 39. 158 stones 6 lbs. 5 ozs.<br>2 drams. |
| 325 drams.                         | 40. 2159 qrs. 15 lbs. 11 ozs.            |
| 591 ounces.                        | 41. 214 drams.                           |
| 1,648 drams.                       | 42. 181 ounces.                          |
| 785 ounces.                        | 43. 3479 drams.                          |
| 4,781 drams.                       | 44. 3592 drams.                          |
| 568 lbs.                           | 45. 1544 ounces.                         |
| 520 stones.                        | 46. 14,480 drams.                        |
| 7 tons 9 cwts.                     | 47. 28,234 ounces.                       |
| 3 tons 9 cwts. 3 lbs.              | 48. 487,436 drams.                       |
| 3 tons 11 cwts. 5 stones.          | 49. 17,416 lbs.                          |
| 747 tons 7 cwts.                   | 50. 1088 stones.                         |
| 44 cwts. 2 qrs. 18 lbs.<br>13 ozs. | 51. 73 tons 9 cwts. 3 lbs.               |
| 39 st. 6 lbs. 1 oz. 6 drs.         | 52. 43 tons 11 cwts. 5 stones.           |
| 559 qrs. 19 lbs. 5 ozs.            | 53. 2749 tons 7 cwts.                    |
| 5,995 ounces.                      | 54. 444 cwts. 2 qrs. 18 lbs.<br>13 ozs.  |
| 16,110 drams.                      | 55. 189 stones 6 lbs. 1 oz.<br>6 drams.  |
| 2,684 lbs.                         | 56. 1559 qrs. 19 lbs. 5 ozs.             |
| 352 stones.                        | 57. 15,778 lbs.                          |
| 7 tons 5 cwts. 7 stones.           | 58. 143,568 drams.                       |
| 3 tons 19 cwts. 1 qr.<br>3 lbs.    | 59. 3 qrs. 15 lbs. 10 ozs.               |
| 40 cwts. 1 qr. 21 lbs.<br>9 ozs.   | 60. 112,000 lbs.                         |

### Exercise 36.

- |                                      |   |
|--------------------------------------|---|
| 3,000 seconds.                       | 16. 549 days.                                     |
| 4,480 minutes.                       | 17. 455 days.                                     |
| 72 hours.                            | 18. 26,356 hours.                                 |
| 20 days.                             | 19. 2,248,200 seconds.                            |
| 24 weeks.                            | 20. 286,560 minutes.                              |
| 3,240 minutes.                       | 21. 1,989,900 seconds.                            |
| 651,200 minutes.                     | 22. 270 days.                                     |
| 676,800 seconds.                     | 23. 1260 days.                                    |
| 1,168,000 seconds.                   | 24. 17,671 hours.                                 |
| 3,224 hours.                         | 25. 4,061,700 seconds.                            |
| 4 hrs. 40 mins. 43 secs.             | 26. 370,080 minutes.                              |
| 1 days 15 hrs. 56 min.               | 27. 4,062,180 seconds.                            |
| 31 weeks 5 days 18<br>hours.         | 28. 1 month 1 week 5 days<br>23 hours 58 minutes. |
| 71 years 289 days.                   | 29. 2 days 7 hours 34 min.                        |
| days 22 hours 24 min.<br>47 seconds. | 30. 75 weeks 5 days 17 hours<br>23 minutes.       |

- |   |  |
|---|--|
| 31. 1 week 3 days 23 minutes<br>35 seconds.           | 36. 11 days 13 hours 46 min—<br>42 seconds.  |
| 32. 29 yrs. 143 days 21 hours.                        | 37. 9 weeks 6 days 10 hour—<br>41 minutes.   |
| 33. 13 months 1 week 6 days<br>3 hours.               | 38. 7 weeks 23 hrs. 19 mins—                 |
| 34. 3 days 19 hours 31 mins.<br>8 seconds.            | 39. 55 years 80 days 9 hours—                |
| 35. 2 months 5 days 7 hours<br>13 minutes 52 seconds. | 40. 7 months 5 days 15 hours—<br>44 minutes. |

### Exercise 37.

- |                              |  |
|------------------------------|--|
| 1. 6084 ounces.              | 13. 32 lbs. 1 oz. 10 dwts.                 |
| 2. 15,600 dwts.              | 14. 13,826 lbs. 1 oz. 7 dwts.<br>9 grains. |
| 3. 97,920 grains.            | 15. 3307 dwts. 13 grains.                  |
| 4. 2940 dwts.                | 16. 81 lbs. 1 oz. 6 dwts. 19<br>grains.    |
| 5. 5184 grains.              | 17. 330 lbs. 10 ozs. 15 dwts.              |
| 6. 51,194 grains.            | 18. 1221 ozs. 10 dwts. 21 grs.             |
| 7. 57,472 grains.            | 19. 38,500 dwts. 16 grs.                   |
| 8. 111,372 dwts.             | 20. 1282 lbs. 4 ozs. 7 dwts.<br>11 grains. |
| 9. 3861 grains.              |  |
| 10. 307 lbs. 6 ounces.       |  |
| 11. 296 lbs. 5 ozs. 11 dwts. |  |
| 12. 175 ozs. 6 dwts. 18 grs. |  |

### Exercise 38.

- |  |  |
|--|--|
| 1. 32 inches.  | 19. 3309 feet.   |
| 2. 139 inches.                                       | 20. 83 miles 4 fur. 31 per. 1<br>yard 0 feet 0 inches.   |
| 3. 198 inches.                                       | 21. 40,320 yards (Irish).                                |
| 4. 13,680 inches.                                    | 22. 4095 feet.   |
| 5. 1436 yards 2 feet 6 inches.                       | 23. 594,720 inches.                                      |
| 6. 9757 yards 1 foot 0 inches.                       | 24. 19,908 inches.                                       |
| 7. 960 perches.                                      | 25. 131 miles 3 fur. 10 per.<br>3 yards.                 |
| 8. 405 perches.                                      | 26. 21 miles 7 fur. 17 per. 3<br>yards 0 feet 11 inches. |
| 9. 238 miles 3 fur. 14 per.                          | 27. 558 fur. 39 per. 1 yard<br>0 feet 6 inches.          |
| 10. 1793 miles 6 fur. 29 per.                        | 28. 69 leagues 2 miles 2 fur.<br>2 per. 3 yards.         |
| 11. 8760 perches.                                    | 29. 15 miles 6 fur. 10 per. 2<br>yards 2 feet 4 inches.  |
| 12. 1920 perches.                                    | 30. 1 furlong 30 perches 1<br>yard.                      |
| 13. 63,360 inches.                                   |  |
| 14. 129,888 inches.                                  |  |
| 15. 190,080 inches.                                  |  |
| 16. 5 miles 7 fur. 2 per. 1 yard<br>1 ft. 11 inches. |  |
| 17. 697 yards.                                       |  |
| 18. 3240 inches.                                     |  |

## Exercise 39.

- |                           |  |
|---------------------------|--|
| ,438 sq. inches.          | 14. 53 sq. yards 2 sq. feet 99<br>sq. inches.                              |
| ,848 sq. inches.          | 15. 890 acres.   |
| ,970 sq. inches.          | 16. 4335 sq. perches.  |
| ,120 sq. perches.         | 17. 46 sq. yards 0 sq. feet 66<br>sq. inches.                              |
| 60 sq. perches.           | 18. 4 sq. yards 7 sq. feet 87<br>sq. inches.                               |
| ,200 sq. yards.           | 19. 6,272,640 sq. inches.  |
| ,962 sq. feet.            | 20. 1 acre 2 roods 15 perches<br>2 sq. yards 2 sq. feet<br>100 sq. inches. |
| ,476 sq. feet.            |  |
| ,273 sq. yards (Irish).   |  |
| ,780 sq. feet.            |  |
| ,91,212 sq. inches.       |  |
| ,73,968 sq. inches.       |  |
| acres 3 roods 25 perches. |  |

## Exercise 40.

- |                          |                                  |
|--------------------------|----------------------------------|
| nails.                   | 6. 28,841 Eng. ells 2 qrs. 1 nl. |
| nails.                   | 7. 549 nails.                    |
| nails.                   | 8. 2947 Eng. ells 1 qr.          |
| ,16 nails.               | 9. 3492 yards 2 qrs.             |
| ,17 yards 1 qr. 3 nails. | 10. 33,022 Fl. ells 2 qrs. 1 nl. |

## Exercise 41.

- |                         |  |
|-------------------------|--|
| 92 noggins.             | 13. 49 bush. 3 pecks 1 gallon<br>1 quart.          |
| 88 pints.               | 14. 316 pints.                                     |
| 92 noggins.             | 15. 361 pints.                                     |
| gallons 3 gills.        | 16. 284 gills.                                     |
| 04 gills.               | 17. 1 load 2 qrs. 2 bush. 3 pks.                   |
| ,188 pecks.             | 18. 20,216 quarts.                                 |
| 2 gals. 3 qts. 3 gills. | 19. 109,609 bushels 2 pecks<br>1 gill 2 quarts.    |
| 6 qrs. 1 bush. 1 peck.  | 20. 13,701 qrs. 1 bushel 2<br>pecks 1 gall. 2 qts. |
| 0 noggins.              |  |
| 5 qrs. 1 bush. 2 pecks. |  |
| 11 quarts.              |  |
| 9 bushels.              |  |

## Exercise 42.

- |                          |  |
|--------------------------|--|
| 51,443 seconds.          | 5. 20,720 lbs.                             |
| on 4 cwts. 2 qrs. 4 lbs. | 6. 9 wks. 0 dys. 9 hrs. 49<br>mins.        |
| 1 ozs.                   | 7. 6 wks. 5 dys. 5 hrs. 35<br>min. 5 secs. |
| on. 4 cwt. 2 qrs. 8 lbs. |  |
| 1 drams.                 |  |
| 12 pints.                |  |

- |   |                                   |
|---|-----------------------------------|
| 8. 60 cwts. 1 qr. 16 lbs.<br>10 oza.    | 38. £5. 6s. 5 $\frac{1}{2}$ d.    |
| 9. 65,936 ounces.                       | 39. 1223 crowns.                  |
| 10. 5 dys. 19 hrs. 3 mins.<br>47 secs.  | 40. 1s. 3d.                       |
| 11. 11 dys. 16 hrs. 9 mins.<br>47 secs. | 41. 1s. 10 $\frac{1}{2}$ d.       |
| 12. 17 tons 14 lbs. 14 drams.           | 42. 1s. 11 $\frac{1}{2}$ d.       |
| 13. 44,447 farthings.                   | 43. 12 timea.                     |
| 14. £49. 10s.                           | 44. £4. 11s. 6d.                  |
| 15. 24,796,800 seconds.                 | 45. £140. 12s. 6d.                |
| 16. 2750 grains.                        | 46. 4s.                           |
| 17. 203 yds. 0 ft. 3 ins.               | 47. £4. 13s. 4d.                  |
| 18. 36,960 hours.                       | 48. 3s. 1d.                       |
| 19. 20,016 lbs.                         | 49. 8s. 9d.                       |
| 20. 1680 ounces.                        | 50. £7. 16s. 8d.                  |
| 21. 5070 fourpenny pieces.              | 51. 2 $\frac{1}{2}$ d. per ounce. |
| 22. 6600 yards.                         | 52. 5 $\frac{1}{2}$ d. per stone. |
| 23. 400 times.                          | 53. £1. 10s.                      |
| 24. 1260 yards.                         | 54. £172. 16s.                    |
| 25. 1s. 0 $\frac{1}{2}$ d. per lb.      | 55. £11. 12s.                     |
| 26. 7d. per lb.                         | 56. £2. 1s. 8d.                   |
| 27. 143 yards.                          | 57. £7. 13s. 4d.                  |
| 28. £74. 2s.                            | 58. 42 times.                     |
| 29. £2. 3s. 9d.                         | 59. £4. 16s. 9d.                  |
| 30. 768 yards.                          | 60. £2812. 10s.                   |
| 31. 5,594 $\frac{1}{2}$ times.          | 61. £2. 2s.                       |
| 32. 400 crowns.                         | 62. £4. 13s. 4d.                  |
| 33. £2000.                              | 63. Half-crowns.                  |
| 34. £49. 19s. 10 $\frac{1}{2}$ d.       | 64. 16s. 3d. each.                |
| 35. 3445 nails.                         | 65. 99,899.                       |
| 36. £215. 3s. 9d.                       | 66. £1.                           |
| 37. £3961. 4s. 9 $\frac{1}{2}$ d.       | 67. £999. 19s. 6 $\frac{1}{2}$ d. |
|   | 68. 2874 crowns.                  |
|   | 69. 42 threepennies.              |
|   | 70. 341,920 seconds.              |

## EXAMINATION EXERCISES FOR FOURTH CLAS

## SET I.

| A1.                                    | B1.                                 |
|--|-------------------------------------|
| 1. £940. 3s. 0 $\frac{1}{2}$ d.        | 1. £8. 18s. 4 $\frac{1}{2}$ d.      |
| 2. £14. 8s. 11 $\frac{1}{2}$ d.        | 2. £4911. 4s. 11 $\frac{1}{2}$ d.   |
| 3. 239 crowns.                         | 3. 62,834,000.                      |
| 4. 511,382 farthings.                  | 4. 3,851 nails.                     |
| 5. 164 tons 16 cwts. 3 qrs.<br>19 lbs. | 5. £7085. 5s. 9 $\frac{1}{2}$ d.    |
| 6. £3127. 3s. 10 $\frac{1}{2}$ d.      | 6. 88 days 14 hrs. 12 min<br>1 sec. |

## C1.

1. 15s. 3d.  
crown.  
+ 41.  
3s. 10½d.  
1.  
2s. 2½d. + 91 over.

## D1.

1. £2. 18s. 9½d. + 9.  
2. £124. 6s. 9d.  
3. £1704. 7s. 2½d.  
4. £2. 6s. 9½d. + 9.  
5. £4. 18s. 11½d.  
6. 1591 crowns.

## E1.

- 8 ounces.  
+ 12.  
17s. 3d.  
340 threepences.  
0s. 4½d.  
yards.

## F1.

1. 1482 pence.  
2. 9193 + 96.  
3. 1771 lbs.  
4. 358,020 seconds.  
5. £49. 18s. 5¾d.  
6. 33,600 lbs.

## G1.

- half-crowns.  
10 + 48.  
2 yards.  
16s. 5½d.  
1,600 seconds.  
0s. 2½d.

## H1.

1. 1368 grains.  
2. 11s. 5½d. + 40.  
3. £165. 0s. 7d.  
4. £470. 6s. 4½d.  
5. £25. 6s. 3d. + 75.  
6. £348. 4s. 0½d.

## I1.

- 9 yards.  
2.  
2. 10s. 11¾d.  
acres 1 rood 8 perches.  
2s. 9½d. + 236.  
6s. 10¾d.

## K1.

1. £4109. 2s. 10½d.  
2. 31,121 yards.  
3. 901,991.  
4. 2½d. + 712.  
5. £4. 0s. 4½d.  
6. 2798 half-crowns 2s. 3d.

## L1.

- 10 lbs.  
1,920 seconds.  
120 threepences.  
15s.  
1s. 3½d.  
6s. 10d.

## M1.

1. £99. 18s. 1d.  
2. 66,666 threepences + 2d.  
3. £1064. 19s. 9½d.  
4. £184. 15s. 5d.  
5. £15. 12s. 6½d. + 8.  
6. £24,668. 10s.

## N1.

1. £605. 5s. 7d.
2. 8960 ounces.
3. 496,982 farthings.
4. £435. 3s. 9d.
5. 330 cwts. 0 qrs. 12 lbs.
6. 1729 + 3 over.

## O1.

1. 1399 crowns 1s. 8d.
2. 15s. 1d. + 102.
3. 69,008,000.
4. 53 cwts. 1 qr. 4 lbs.
5. £999. 19s. 3½d.
6. 13,421 lbs.

## P1.

1. £1359. 0s. 2d.
2. £548. 4s. 3½d.
3. £12. 18s. 6½d.
4. £86,842. 10s. 4½d.
5. 41 tons 16 cwts. 1 qr. 12 lbs.
6. 3807 crowns.

## Q1.

1. 5280 threepences.
2. 735,173,472.
3. 18,134 farthinga.
4. 7600 threepences.
5. 165 lbs. 0 oz. 7 dwts.
6. 1081 + 72.

## R1.

1. £47. 0s. 0½d.
2. 42,000 fourpences.
3. 43 tons 4 cwts. 1 qr. 27 lbs.
4. 57,135,600.
5. 364 + 79.
6. 22,488 grains.

## S1.

1. 15,144 crowns 2s. 6d.
2. 11s. 8½d. + 85.
3. 81 cwts. 0 qrs. 15 lbs.
4. £89. 19s. 3½d.
5. 8792 lbs.
6. £14. 8s. 11½d.

## T1.

1. 825,120 seconds.
2. 2740 + 34.
3. 562 fourpences + 2d.
4. 75,000 threepences.
5. 11s. 0½d.
6. £17. 17s. 4½d.

## W1.

1. 186s. 11d.
2. 179,200 lbs.
3. 580,200 minutes.
4. £347. 8s. 11½d.
5. £92. 8s. 3½d.
6. £3. 18s.

## X1.

1. 87,288 farthings.
2. 37 acres 1 rood 7 perches.
3. 95,009.
4. 1200 fourpences.
5. £46. 2s. 3½d.
6. 383 crowns.

## Y1.

1. 12,000 fourpences.
2. 24 acres 3 roods 4 perch.
3. £62. 7s. 6½d.
4. 29,211 threepences.
5. 12s. 7½d. + 13.
6. £9957. 12s. 5½d.

## Z1.

- |                  |                                 |
|------------------|---------------------------------|
| 1. 1170 pence.   | 4. 3000 fourpences.             |
| 2. £23. 3s. 10d. | 5. £3. 10s. 6d.                 |
| 3. 12s. 5d.      | 6. £99. 19s. 2 $\frac{1}{4}$ d. |

## SET II.

## A2.

1. £6591. 18s. 7d.
2. £24,108. 8s. 10d.
3. £1. 0s. 9d.
4. £314,918. 0s. 8d.
5. £201. 15s. 6d. + 462.
6. £8189. 19s. 5 $\frac{1}{4}$ d.

## C2.

1. £126. 10s. 8 $\frac{1}{2}$ d. + 31.
2. £12. 15s. 11 $\frac{1}{2}$ d. + 150.
3. 1 ton 13 cwt. 3 qrs. 26 lbs.  
4 oz.
4. £486. 9s. 0d.
5. £5. 2s. 2 $\frac{1}{2}$ d. + 12.
6. £19,368. 6s. 3d.

## E2.

1. 17,568 ounces.
2. Man, £2. 7s. 6d.; woman,  
£2. 12s. 6d.
3. £7944. 19s. 6 $\frac{1}{2}$ d.
4. £15. 1s. 6 $\frac{1}{2}$ d.
5. 63 sq. yds. 7 sq. ft. 126 sq. in.
6. 960 threepenny pieces.

## G2.

1. £0. 19s. 9 $\frac{1}{4}$ d.
2. 6736 lbs.
3. £7407. 14s. 10 $\frac{1}{2}$ d.
4. 89 lbs.
5. 400 threepences.
6. £9. 2s. 5 $\frac{1}{2}$ d.

## I2.

1. £7676.
2. £12. 7s. 2 $\frac{1}{2}$ d. + 152.
3. 1 wk. 2 dys. 8 hrs. 0 min. 9 sec.
4. 6084 half-crowns.
5. 1347 ounces.
6. 29,877 + 123.

## B2.

1. £10,594. 10s. 0d.
2. £32. 11s. 0 $\frac{1}{2}$ d. + 290.
3. £0. 10s. 0d.
4. £10. 6s. 3d.
5. 4774 inches.
6. £1510. 18s. 6 $\frac{1}{2}$ d.

## D2.

1. £29. 8s. 3 $\frac{1}{2}$ d. + 11.
2. 51 miles 2 furlongs 1 perch  
3 yards 2 feet 6 inches.
3. 4415 tons.
4. £3945. 12s. 2d.
5. 14 miles 3 furlongs 29 perches  
4 yards 1 foot 6 inches.
6. £1112. 10s. 7 $\frac{3}{4}$ d.

## F2.

1. 38,109 lbs.
2. £0. 19s. 11 $\frac{1}{2}$ d. + 71.
3. £981. 6s. 11 $\frac{1}{2}$ d.
4. 244 yards.
5. £99. 2s. 5 $\frac{1}{2}$ d.
6. £783. 7s. 4 $\frac{3}{4}$ d.

## H2.

1. 31,622,400 seconds.
2. £124. 6s. 5 $\frac{1}{2}$ d.
3. 100,352 drams.
4. £88,176. 3s. 11 $\frac{1}{4}$ d.
5. 16s.
6. £1054. 13s. 8 $\frac{1}{4}$ d.

## K2.

1. £30. 12s. 11d. + 40.
2. £192. 3s. 3 $\frac{1}{2}$ d.
3. 10,464 hours.
4. 420 halfpence.
5. £8. 18s. 6d.
6. £19. 6s. 10 $\frac{1}{2}$ d.

## L2.

1. 2880 minutes.
2. 190,080 inches.
3. £6512. 6s. 8d.
4. £50.
5. £70. 10s. 0d.
6. £198. 10s. 8d.

## N2.

1. £288. 10s.
2. 489,908,680.
3. £5. 6s. 5½d.
4. £1168. 5s. 8½d. + 8d.
5. £8910. 8s. 6d.
6. £6040. 1s. 4½d.

## P2.

1. 67,556,620.
2. £1. 17s. 6d.
3. £199,589. 1s. 7½d.
4. 7 weeks 18 hours.
5. 397,510 threepenny pieces.
6. £18. 6s. 8d.

## R2.

1. 15,695 pounds.
2. 2 wks. 0 dys. 17 hrs. 48 mins.  
24 secs.
3. £9040. 6s. 0d.
4. £107. 7s. 2½d.
5. £9. 16s. 10½d.
6. £1888. 5s. 4½d.

## T2.

1. £69,609. 1s. 8½d.
2. £76. 10s. 0½d.
3. £5110. 13s. 8½d.
4. 2,592,000 seconds.
5. 81,500 fourpences.
6. 4200 crowns.

## M2.

1. 5436 - 25.
2. £3253. 5s. 6½d.
3. £54. 5s. 6½d. - 52.
4. £8. 12s. 6d.
5. 27 tons 18 cwt. 6 qm. 4
6. £958. 13s. 3½d.

## O2.

1. £5. 16s. 3d.
2. £45.
3. £12,354. 2s. 2½d.
4. 4500 halfpence.
5. 758,280 minutes.
6. £600. 1s. 8d.

## Q2.

1. 5909 + 28.
2. £19,999. 19s. 9½d.
3. 12 oranges.
4. £62. 14s. 10½d.
5. 2142 sixpences.
6. 560 stones.

## S2.

1. £2991. 19s. 4½d.
2. £906. 10s. 10½d.
3. 985 + 6.
4. 11½d.
5. 129 stones 10 lbs.
6. £35,785. 2s. 7½d.

## V2.

1. £1. 10s. 7d.
2. 105,840 farthings.
3. 3,338,220 seconds.
4. 4500 halfpence.
5. 15 shillings.
6. 576 pence.

## L2.

1. 2880 minutes.
2. 190,080 inches.
3. £6512. 6s. 8d.
4. £50.
5. £70. 10s. 0d.
6. £193. 10s. 8d.

## N2.

1. £283. 10s.
2. 489,903,680.
3. £5. 6s. 5½d.
4. £1163. 5s. 3½d. + 36.
5. £8919. 3s. 6½d.
6. £6040. 1s. 4½d.

## P2.

1. 67,556,620.
2. £1. 17s. 6d.
3. £199,589. 1s. 7½d.
4. 7 weeks 18 hours.
5. 397,510 threepenny pieces.
6. £13. 6s. 3d.

## R2.

1. 15,695 pounds.
2. 2 wks. 6 dys. 17 hrs. 48 mins.  
24 secs.
3. £9046. 5s. 0½d.
4. £107. 7s. 2½d.
5. £9. 16s. 10½d.
6. £1383. 5s. 4½d.

## T2.

1. £69,609. 1s. 8½d.
2. £76. 10s. 0½d.
3. £5110. 13s. 8½d.
4. 2,592,000 seconds.
5. 31,500 fourpences.
6. 4200 crowns.

## M2.

1. 8438 + 28.
2. £5258. 5s. 6½d.
3. £54, 5s. 0½d. + 52.
4. £8. 12s. 6d.
5. 27 tons 18 cwts. 0 qrs. 4 lbs.
6. £958. 13s. 3½d.

## O2.

1. £5. 16s. 3d.
2. £45.
3. £12,354. 2s. 2½d.
4. 4500 halfpence.
5. 758,280 minutes.
6. £600. 1s. 8d.

## Q2.

1. 5909 + 28.
2. £19,999. 19s. 9½d.
3. 12 oranges.
4. £62. 14s. 10½d.
5. 2142 sixpences.
6. 560 stones.

## S2.

1. £2991. 19s. 4½d.
2. £906. 10s. 10½d.
3. 985 + 6.
4. 11½d.
5. 129 stones 10 lbs.
6. £35,735. 2s. 7½d.

## V2.

1. £1. 10s. 7d.
2. 105,840 farthings.
3. 3,338,220 seconds.
4. 4500 halfpence.
5. 15 shillings.
6. 576 pence.

THE  
IRISH SCHOOL ARITHMETIC.  
PART II.

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ANSWERS.

Exercise 1.

- |   |  |
|---|--|
| 1. 15 wks. 0 dys. 14 hrs. 17 mins. 36 secs. | 24. 31 stones 4 lbs. 7 ozs.                      |
| 2. 49 mos. 0 wks. 3 dys. 12 hrs. 17 mins.   | 25. 68,096 drs.                                  |
| 3. 62 pints.                                | 26. 26,880 drs.                                  |
| 4. 468,939 gals. 1 qt. 1 pt.                | 27. 10 lbs.                                      |
| 5. 76 pints.                                | 28. 8 lbs.                                       |
| 6. 66 pints.                                | 29. 504,000 grains.                              |
| 7. 51,968 noggins.                          | 30. 16 lbs. 3 ozs. 6 dwts. 18 grains.            |
| 8. 27 tons 18 cwts. 0 qrs. 5 lbs. 3 ozs.    | 31. 501,120 grains.                              |
| 9. 11,760 lbs.                              | 32. 609,000 grains.                              |
| 10. 50,000 stones 5 lbs.                    | 33. 13 Avoir. lbs.                               |
| 11. 42,560 lbs.                             | 34. 10,797,160 yards.                            |
| 12. 26 tons 15 cwts. 2 qrs. 24 lbs.         | 35. 5 miles 3 fur. 37 per. 3 yds. 2 ft. 6 in.    |
| 13. 91,280 lbs.                             | 36. 15,840 feet.                                 |
| 14. 784 ozs.                                | 37. 34 yds. 1 ft. 6 in.                          |
| 15. 15 cwts. 0 qrs. 20 lbs.                 | 38. 3345 inches.                                 |
| 16. 6 tons 1 cwt. 2 qrs. 1 lb.              | 39. 4 miles.                                     |
| 17. 3125 tons 0 cwts. 0 qrs. 7 lbs.         | 40. 626,560 yards.                               |
| 18. 4001 stones.                            | 41. 10,969,860 yards.                            |
| 19. 112,000 lbs.                            | 42. 4 I. mls. 4 fur. 32 per. 0 yds. 2 ft.        |
| 20. 5301 st. 4 lbs. 12 ozs. 1 dr.           | 43. 47,985 feet.                                 |
| 21. 35,493 lbs.                             | 44. 25 sq. per. 15 sq. yds. 3 sq. ft. 34 sq. in. |
| 22. 104 cwts. 2 qrs. 14 lbs. 12 ozs. 7 drs. | 45. 413,820 sq. ft.                              |
| 23. 15,778 lbs.                             | 46. 4 ac. 0 rds. 16 sq. per. 19 sq. yds.         |
| (882)                                       | 47. 307,200 sq. perches.                         |

48. 17,036,800 sq. yds.  
 49. 2 ac. 0 rd. 32 sq. per. 28  
     sq. yds. 3 sq. ft.  
 50. 29,427,200 sq. yds.  
 51. 84,900,618 sq. ft.  
 52. 160 ac. 2 rds. 31 sq. per.  
     20 sq. yds. 7 sq. ft. 36  
     sq. in.  
 53. 20 ac. 1 rd. 19 sq. per. 29½  
     sq. yds.  
 54. 37,510 sq. yds.  
 55. 35,840 acres.  
 56. 37 ac. 3 rds. 12 sq. per.  
 57. 22 ac. 3 rds. 33 sq. per. 2  
     sq. yds. 7 sq. ft. 108 sq.  
     in.  
 58. 1033 ac. 0 rds. 11 sq. per.  
     7½ sq. yds.  
 59. 42,340,320 sq. in.  
 60. 533 sq. yds. 0 sq. ft. 69  
     sq. in.  
 61. 91,476 sq. ft.  
 62. 0 sq. mls. 2 ac. 2 rds. 8 sq.  
     per. 18 sq. yds. 5 sq. ft.  
     120 sq. in.  
 63. 99,597,888 sq. in.  
 64. 147,735 sq. yds.  
 65. 3 wks. 3 dys. 12 hrs.  
 66. 7,948,800 secs.  
 67. 518,400 secs.  
 68. 81 hours.  
 69. 31,556,930 secs.  
 70. 2,505,600 secs.  
 71. 8784 hours.  
 72. 166 days.  
 73. 2,551,443 secs.  
 74. 20,160 mins.  
 75. 2,678,400 secs.  
 76. 12 yrs. 4 mos. 1 wk. 4  
     dys. 9 hrs. 25 min.  
 77. 1 yr. 50 dys. 4 hrs. 24  
     min.  
 78. 4142 gals.  
 79. 66,544 pints.  
 80. 812 bus. 0 pkgs. 0 gallons.  
     2 qts. 1 pt.  
 81. 260 gallons. 3 qts. 0 pts.  
     1 gill.  
 82. 49 qrs. 5 bus. 3 pkgs. 1 gall.  
     2 qts.  
 83. 173 bus. 1 pk. 1 gall.  
 84. 32,832 c. inches.  
 85. 414 nails.  
 86. 59,664 nails.  
 87. 373,717 c. inches.  
 88. 34,728 c. inches.  
 89. 4 c. yards 17 c. feet.  
 90. 3,297,024 c. inches.  
 91. 37 c. yards 1 c. foot.  
 92. 16 c. yards.  
 93. 167,920 nails.  
 94. 448,414 c. inches.  
 95. 1028 Flemish ells 2 qrs.  
     1 nail.  
 96. 224,928 nails.  
 97. 1542 yds. 2 nails.  
 98. 6242 French ells 4 nails.  
 99. 7706<sup>1</sup><sub>000</sub> lbs. (Av.).  
 100. 816 lbs. 8 ozs.  
 101. 825<sup>9</sup><sub>175</sub> ozs. (Av.).  
 102. 898<sup>47</sup><sub>50</sub> ozs. (Troy).  
 103. 618<sup>13</sup><sub>175</sub> Av. lbs.  
 104. 1650<sup>13</sup><sub>5</sub> ozs. (Av.).  
 105. 1064<sup>7</sup><sub>175</sub> Troy lbs.  
 106. 721<sup>251</sup><sub>7000</sub> Av. lbs.  
 107. 17 E. mls. 6 fur. 21 per.  
     4 yds. 1 ft. 6 in.  
 108. 21 I. mls. 4 fur. 10 per.  
     5 yds.  
 109. 191 mls. 1 fur. 32 per.  
     4 yds.  
 110. 690 Irish mls. 7 fur. 26  
     per. 2 yds.  
 111. 145 E. ac. 3 rds. 5 sq. per.  
     18<sup>3</sup><sub>4</sub> sq. yds.  
 112. 99 I. ac. 0 rds. 38 sq. per.  
     8 sq. yds.  
 113. 125 qrs. 1 bus. 2 pkgs.  
     4 74,996 English ells.

|                  |                                    |
|------------------|------------------------------------|
| 26,400 sheets.   | 118. 325 lbs. 6 ozs. 5 drs. 1 scr. |
| 375 quires.      | 119. 102,240 scruples.             |
| 22,488 scruples. | 120. 13 lbs. 9 ozs. 2 drs. 2 scr.  |

**Exercise 2.**

1. 743 tons 16 cwts. 1 qr. 10 lbs.
2. 761 mls. 6 fur. 20 per. 2 yds. 2 ft. 4 in.
3. 1011 acs. 3 rds. 31 per.
4. 522 dys. 2 hrs. 18 mins. 8 secs.
5. 970 bus. 1 pk.
6. 831 yrs. 294 dys. 23 hrs.
7. 961 tons 10 cwts. 2 qrs. 16 lbs.
8. 403 lbs. 0 ozs. 1 dwt. 11 grs.
9. 554 yds. 0 qrs. 3 nls.
10. 1372 yrs. 4 mos.
11. 368 lbs. 0 ozs. 15 drs.
12. 1063 acs. 2 rds. 15 per.
13. 507 mls. 4 fur. 9 per.
14. 1026 tons 12 cwts. 1 qr. 10 lbs.
15. 411 mls. 0 fur. 25 per.
16. 605 lbs. 11 ozs. 16 dwt. 17 grs.

**Exercise 3.**

1. 587 tons 9 cwts. 2 qrs. 20 lbs. 8 ozs.
2. 360 tons 19 cwts. 3 qrs. 16 lbs.
3. 11 lbs. 5 ozs. 5 dwts. 15 grs.
4. 18 acs. 2 rds. 17 pers.
5. 276 dys. 20 hrs. 1 min. 47 secs.
6. 2 yrs. 216 dys. 16 hrs.
7. 336 mls. 2 fur. 28 per.
8. 10 yds. 2 qrs. 3 nls.
9. 175 yds. 0 ft. 9 in.
10. 18 cwts. 2 qrs. 22 lbs. 7 oz.
11. 16 dys. 18 hrs. 53 mins. 38 secs.
12. 293 lbs. 7 ozs. 9 dwts. 1 gr.
13. 10 mls. 6 fur. 18 per.
14. 226 cwts. 1 qr. 17 lbs. 8 ozs.
15. 235 bus. 2 pkgs. 1 gal.
16. 687 tons 13 cwts. 0 qrs. 6 lbs.
17. 9 lbs. 2 ozs. 4 dwts. 2 grs.
18. 203 mls. 0 fur. 31 per.
19. 172 yds. 2 qrs. 2 nls.
20. 90 ac. 2 rds. 4 per.

## Exercise 4.

1. 137 tons 9 cwts. 0 qr. 8 lbs.
2. 154 tons 12 cwts. 2 qrs. 23 lbs.
3. 171 tons 16 cwts. 1 qr. 10 lbs.
4. 188 tons 19 cwts. 3 qrs. 25 lbs.
5. 206 tons 3 cwts. 2 qrs. 12 lbs.
6. 122 mls. 3 fur. 24 per.
7. 137 mls. 6 fur. 2 per.
8. 153 mls. 0 fur. 20 per.
9. 168 mls. 2 fur. 38 per.
10. 183 mls. 5 fur. 16 per.
11. 303 acs. 3 rds. 16 per.
12. 341 acs. 3 rds. 13 per.
13. 379 acs. 3 rds. 10 per.
14. 417 acs. 3 rds. 7 per.
15. 455 acs. 3 rds. 4 per.
16. 126 lbs. 4 ozs. 11 dwts. 0 grs.
17. 142 lbs. 2 ozs. 2 dwts. 9 grs.
18. 157 lbs. 11 ozs. 13 dwts. 18 grs.
19. 173 lbs. 9 ozs. 5 dwts. 3 grs.
20. 189 lbs. 6 ozs. 16 dwts. 12 grs.
21. 303 bus. 3 pks. 0 gals. 0 qts.
22. 341 bus. 2 pks. 1 gal. 3 qts.
23. 379 bus. 2 pks. 1 gal. 2 qts.
24. 417 bus. 2 pks. 1 gal. 1 qt.
25. 455 bus. 2 pks. 1 gal. 0 qts.
26. 282 cwts. 3 qrs. 15 lbs. 14 oz. 0 dr.
27. 318 cwts. 1 qr. 0 lb. 5 ozs. 12 drs.
28. 353 cwts. 2 qrs. 12 lbs. 13 ozs. 8 drs.
29. 388 cwts. 3 qrs. 25 lbs. 5 ozs. 4 drs.
30. 424 cwts. 1 qr. 9 lb. 13 ozs. 0 drs.
31. 268 acs. 1 rd. 20 per.
32. 1374 cwts. 0 qrs. 6 lbs.
33. 1053 mls. 4 fur. 35 per.
34. 635 lbs. 5 ozs. 4 dwts. 9 grs.
35. 6137 yds. 2 qrs. 1 nl.
36. 552 tons 5 cwts. 0 qrs.
37. 2232 bus. 0 pks. 0 gals.
38. 2217 cwts. 0 qrs. 21 lbs.
39. 1310 acs. 1 rd. 25 per.
40. 318 qrs. 7 bus. 3 pks.
41. 482 years 1 mo. 2 wks.      wts. 11 grs.
42. 1192 lbs.

43. 2037 dys. 0 hrs. 7 mins. 30 secs.
44. 1250 yds. 2 ft. 6 in.
45. 904 yds. 2 qrs. 0 nls.
46. 1456 sq. yds. 6 sq. ft. 72 sq. in.
47. 11226 cwts. 2 qrs. 7 lbs.
48. 1023 dys. 3 hrs. 55 mins. 52 secs.
49. 1310 yrs. 8 mos. 1 wk.
50. 927 tons 16 cwts. 3 qrs. 11 lbs. 3 ozs.

### Exercise 5.

1. 234 cwts. 2 qrs. 18 lbs.
2. 114 tons 7 cwts. 1 qr. 14 lbs.
3. 531 acs. 1 rd. 25 per.
4. 160 acs. 0 rds.  $27\frac{1}{2}$  per.
5. 180 dys. 23 hrs. 20 mins.
6. 145 mls. 3 fur. 32 per.
7. 352 acs. 2 rds. 0 per.
8. 154 lbs. 9 ozs.  $3\frac{1}{2}$  dwts.
9. 112 lbs. 7 ozs.  $3\frac{1}{2}$  drs.
10. 209 acs. 1 rd.  $7\frac{1}{2}$  per.
11. 526 tons 2 cwts. 2 qrs.
12. 64 yds. 0 qrs.  $1\frac{5}{6}$  nls.
13. 208 yrs. 9 mos.  $0\frac{1}{3}$  week.
14. 298 acs. 3 rds.  $32\frac{1}{2}$  per.
15. 87 cwts. 0 qrs.  $21\frac{1}{4}$  lbs.
16. 5 mls. 7 fur.  $35\frac{7}{8}$  per.
17. 160 tons 8 cwts.  $2\frac{3}{4}$  qrs.
18. 669 lbs. 0 ozs. 10 dwts.  $23\frac{1}{3}$  grs.
19. 770 lbs. 14 ozs.  $14\frac{3}{4}$  drs.
20. 2748 acs. 3 rds.  $3\frac{1}{2}$  per.

### Exercise 6.

1. 25 tons 15 cwts. 1 qr.  $22\frac{1}{2}$  lbs.
2. 22 tons 18 cwts. 0 qrs. 20 lbs.
3. 20 tons 12 cwts. 1 qr.  $12\frac{2}{5}$  lbs.
4. 18 tons 14 cwts. 3 qrs.  $13\frac{9}{11}$  lbs.
5. 17 tons 3 cwts. 2 qrs. 15 lbs.
6. 22 mls. 7 fur. 27 per.
7. 20 mls. 3 fur.  $10\frac{2}{3}$  per.
8. 18 mls. 2 fur.  $37\frac{3}{4}$  per.
9. 16 mls. 5 fur.  $23\frac{3}{11}$  per.

10. 15 mls. 2 fur. 18 per.
11. 56 acres 3 rds.  $35\frac{1}{2}$  per.
12. 50 acres 2 rds.  $22\frac{2}{3}$  per.
13. 45 acres 2 rds.  $12\frac{2}{3}$  per.
14. 41 acres 1 rd.  $29\frac{5}{11}$  per.
15. 37 acres 3 rds. 37 per.
16. 23 lbs. 8 ozs. 7 dwts.  $1\frac{1}{2}$  grs.
17. 21 lbs. 0 ozs. 15 dwts. 4 grs.
18. 18 lbs. 11 ozs. 9 dwts.  $15\frac{1}{3}$  grs.
19. 17 lbs. 2 ozs. 16 dwts.  $1\frac{1}{11}$  grs.
20. 15 lbs. 9 ozs. 11 dwts. 9 grs.
21. 56 bus. 3 pks. 1 gal.  $2\frac{1}{2}$  qrts.
22. 50 bus. 2 pks. 1 gal. 0 qrts.
23. 45 bus. 2 pks. 0 gal. 2 qrts.
24. 41 bus. 1 pk. 1 gal.  $1\frac{5}{11}$  qrts.
25. 37 bus. 3 pks. 1 gal. 3 qrts.
26. 53 cwts. 0 qrs. 4 lbs. 11 ozs. 10 drs.
27. 47 cwts. 0 qrs. 16 lbs. 10 ozs.  $5\frac{1}{3}$  drs.
28. 42 cwts. 1 qr. 20 lbs. 9 ozs.  $4\frac{1}{3}$  drs.
29. 38 cwts. 2 qrs. 8 lbs. 8 ozs.  $7\frac{3}{11}$  drs.
30. 35 cwts. 1 qr. 12 lbs. 7 ozs. 12 drs.
31. 2 acs. 3 rds. 12 per.
32. 17 cwts. 2 qrs. 13 lbs.
33. 5 mls. 3 fur. 9 per.
34. 9 lbs. 2 ozs. 10 dwts. 5 grs.
35. 17 yds. 2 qrs. 3 nls.
36. 5 tons 17 cwts. 2 qrs.
37. 8 bushels.
38. 12 cwts. 2 qrs. 19 lbs.
39. 13 acs. 3 rds. 7 per.
40. 5 qrs. 3 bus. 1 pk.
41. 3 yrs. 8 mos. 2 wks.
42. 15 lbs. 1 oz. 3 dwts. 5 grs.
43. 12 days 8 hrs. 17 mins. 30 secs.
44. 15 yds. 2 ft. 6 in.
45. 3 yds. 1 qr. 2 nails.
46. 18 sq. yds. 6 sq. ft. 12 sq. in.
47. 12 cwts. 3 qrs. 9 lbs.
48. 17 days 8 hrs. 10 mins. 26 secs. + 18.
49. 19 yrs. 6 mos. 3 wks.
50. 3 tons 2 cwts. 3 qrs. 17 lbs. 5 ozs.

## Exercise 7.

- |  |   |
|--|---|
| 1. 27 cwts. 2 qrs. 12 lbs.               | 11. 315 tons 13 cwts. 2 qrs.                        |
| 2. 15 tons 15 cwts. 2 qrs.               | 12. 747 yds. 2 qrs. 1 $\frac{2}{3}$ nl.             |
| 3. 55 acs. 3 rds. 30 per.                | 13. 27 yrs. 2 mos. 2 $\frac{1}{3}$ wks.             |
| 4. 12 acs. 2 rds. 9 $\frac{4}{5}$ per.   | 14. 446 acs. 3 rds. 30 $\frac{2}{3}$ per.           |
| 5. 27 dys. 3 hrs. 30 mins.               | 15. 1575 cwts. 1 qr. 20 $\frac{6}{7}$ lbs.          |
| 6. 12 mls. 5 fur. 8 per.                 | 16. 172 mls. 2 fur. 15 $\frac{1}{3}$ per.           |
| 7. 37 acs. 2 rds. 16 per.                | 17. 294 tons 18 cwts. 1 $\frac{37}{109}$ qr.        |
| 8. 207 lbs. 0 ozs. 7 $\frac{4}{5}$ dwts. | 18. 23 lbs. 8 ozs. 8 $\frac{3}{11}$ dwts.           |
| 9. 98 lbs. 12 ozs. 12 drs.               | 19. 4 lbs. 3 ozs. 11 $\frac{15}{22}$ drs.           |
| 10. 29 acs. 3 rds. 13 $\frac{7}{5}$ per. | 20. 5 acs. 1 rd. 10 $\frac{27}{59}\frac{4}{5}$ per. |

## Exercise 8.

- |  |  |
|--|--|
| 1. £88,176, 3s. 11 $\frac{1}{4}$ d.                      | 26. £192, 3s. 3 $\frac{1}{2}$ d.                 |
| 2. £24, 19s. 6 $\frac{2}{3}$ d. + 116.                   | 27. 95 tons 7 cwts. 3 qrs. 15<br>lbs.            |
| 3. 31,622,400 seconds.                                   | 28. 74 sq. mls. 410 acs. 0 rds.<br>19 sq. poles. |
| 4. 1 ton 12 cwts. 3 qrs. 7 lbs.                          | 29. 190,080 inches.                              |
| 5. £124, 6s. 5 $\frac{1}{2}$ d.                          | 30. 25 gardens.                                  |
| 6. 100,352 drams.  | 31. 27 weeks.                                    |
| 7. £1210, 1s. 5d.  | 32. 231 yds. 1 ft.                               |
| 8. 132 yrs. 29 wks. 3 dys.<br>23 hrs. 28 mins.           | 33. 124 tons 11 cwts. 0 qrs.<br>4 lbs.           |
| 9. 676 tons 4 cwts. 2 qrs.<br>10 lbs.                    | 34. 21 acres.                                    |
| 10. £324, 10s.   | 35. 10,464 hours.                                |
| 11. 14 cwts. 1 qr. 1 st. 10 lbs.                         | 36. 109 tons 4 cwts. 3 qrs. 5<br>lbs.            |
| 12. 2 tons 9 cwts. 2 qrs. 0 lbs.<br>13 ozs. 7 drs. + 11. | 37. 27 tons 18 cwts. 0 qrs. 4 lbs.               |
| 13. 1 wk. 2 dys. 8 hrs. 0 mins.<br>9 secs.               | 38. £283, 10s.                                   |
| 14. 57 parcels.  | 39. 2880 minutes.                                |
| 15. 57 lbs. 14 ozs.                                      | 40. 420 halfpence.                               |
| 16. 1440 mins.   | 41. 342 yrs. 0 mos. 1 wk.                        |
| 17. 7,948,800 secs.                                      | 42. 10 shillings.                                |
| 18. £30, 12s. 11d. + 40.                                 | 43. £10, 6s. 3d.                                 |
| 19. 5876 qrs. 7 bus. 3 pks.<br>1 qrt. 1 pt.              | 44. 240 oranges.                                 |
| 20. £2, 15s. 10d.  | 45. Man £2, 7s. 6d. Woman<br>£2, 12s. 6d.        |
| 21. 190,230 inches.                                      | 46. 89 lbs.                                      |
| 22. 99 people.   | 47. £71, 2s.                                     |
| 23. 4739 mls. 5 fur.                                     | 48. 1 ton 3 cwts. 1 qr. 1 lb.                    |
| 24. 6084 half-crowns.                                    | 49. £147, 15s.                                   |
| 25. 1347 ozs.  | 50. 16,560 minutes.                              |

|                                   |  |
|-----------------------------------|--|
| 51. 60 dollars.                   | 67. £2, 4s. 6d.                                  |
| 52. 2750 grains.                  | 68. £74, 2s.                                     |
| 53. 4 bush. 3 pks. 2 qts.         | 69. 46½ pecks.                                   |
| 54. 21,120 steps.                 | 70. 768 yards.                                   |
| 55. 70 times.                     | 71. 5594½ times.                                 |
| 56. 26 tons 9 cwts. 2 qrs. 6 lbs. | 72. £23, 12s. 0½d.                               |
| 57. 804 score.                    | 73. 2s. 2½d.                                     |
| 58. 1680 ounces.                  | 74. 69,633,984 grm.                              |
| 59. 6600 yards.                   | 75. 9 wkm. 6 dyd. 11 km<br>mina.                 |
| 60. 387 $\frac{1}{4}$ times.      | 76. 13,728 pinta.                                |
| 61. 100½ yards.                   | 77. 1364 mka. 4 fur. 17 $\frac{1}{2}$<br>4½ yda. |
| 62. 18½ parcels.                  | 78. 2,648,296 cu. inches.                        |
| 63. The 7½d.                      | 79. 47,847,637 seconds.                          |
| 64. 2s. 9½d. per yard.            | 80. 15,351 qrs. 4 bush. 2                        |
| 65. 16s. 2½d. per yard.           |  |
| 66. 30½ yards.                    |  |

## Exercise 9.

|        |         |          |         |       |
|--------|---------|----------|---------|-------|
| 1. 4.  | 5. 26.  | 9. 99.   | 13. 49. | 17. 7 |
| 2. 9.  | 6. 57.  | 10. 13.  | 14. 32. | 18. 6 |
| 3. 27. | 7. 100. | 11. 130. | 15. 50. | 19. 9 |
| 4. 3.  | 8. 17.  | 12. 42.  | 16. 77. | 20. 1 |

## Exercise 10.

|                        |                          |
|------------------------|--------------------------|
| 1. 6.                  | 11. £2.                  |
| 2. 9.                  | 12. 68 pecks.            |
| 3. 04.                 | 13. £6, 2s. 6d.          |
| 4. 36.                 | 14. 2 dys. 10 hrs. 12 m. |
| 5. £2400.              | 15. 34 acres.            |
| 6. 12s. 4½d.           | 16. 5 men.               |
| 7. £13, 1s. 3d.        | 17. 129 cwts. 2 qrs.     |
| 8. £118.               | 18. 100 bushels.         |
| 9. 1 ac. 1 rd. 10 per. | 19. £13, 10s.            |
| 10. 4½ pecks.          | 20. £1428.               |

## Exercise 11.

|            |              |             |
|------------|--------------|-------------|
| 1. 3s. 4d. | 5. 3s. 8d.   | 9. 1s. 8½d. |
| 2. 8d.     | 6. 3s. 6d.   | 10. 1d.     |
| 3. 1s. 9d. | 7. 4s. 11½d. | 11. 3½d.    |

| <i>£</i> | <i>s.</i> | <i>d.</i> |  | <i>£</i> | <i>s.</i> | <i>d.</i>   |           | <i>£</i> | <i>s.</i>        | <i>d.</i> |
|----------|-----------|-----------|--|----------|-----------|-------------|-----------|----------|------------------|-----------|
| 1        | 0         | 0         |  | 39.      | 6         | 7           | 6         | 64.      | £2890.           |           |
| 8        | 15        | 0         |  | 40.      | 2         | 4           | 4½        | 65.      | £1490.           |           |
| 22       | 2         | 0½        |  | 41.      | 4         | 16          | 8         | 66.      | £7, 8s.          |           |
| 14       | 6         | 2½        |  |          |           |             |           | 67.      | £4, 15s. 7d.     |           |
| 70       | 0         | 0         |  | 42.      | 110       | lbs.        |           | 68.      | £15, 13s. 6d.    |           |
| 398      | 7         | 3         |  | 43.      | 2         | tons        | 10 cwts.  | 69.      | 28 cows.         |           |
| 23       | 18        | 1½        |  | 44.      | 20        | cwts.       |           | 70.      | 9 men.           |           |
| 3        | 0         | 4½        |  | 45.      | 1         | cwt.        | 2 qrs.    | 71.      | 16 days.         |           |
| 76       | 8         | 4         |  | 46.      | 136½      | lbs.        |           | 72.      | 24 ac. 2 roods.  |           |
| 0        | 1         | 0         |  | 47.      | £14.      |             |           | 73.      | £82, 10s.        |           |
| 0        | 0         | 8         |  | 48.      | 8         | cwts.       |           | 74.      | 160 tons.        |           |
| 252      | 0         | 0         |  | 49.      | £202,     | 8s.         |           | 75.      | 29 acres.        |           |
| 0        | 5         | 7½        |  | 50.      | £12,      | 13s.        | 2d.       | 76.      | £35.             |           |
| 7        | 2         | 0         |  | 51.      | £6,       | 13s.        |           | 77.      | £3, 0s. 11d.     |           |
| 3        | 6         | 0         |  | 52.      | 5s.       | 6d.         |           | 78.      | £6, 6s.          |           |
| 1        | 12        | 1½        |  | 53.      | 20        | sovereigns. |           | 79.      | 400 packs.       |           |
| 12       | 18        | 3½        |  | 54.      | 2         | lbs.        | 11 ozs.   | 80.      | £140, 15s. 10½d. |           |
| 3        | 0         | 1         |  | 55.      | 34        | feet.       |           | 81.      | £28.             |           |
| 75       | 18        | 7½        |  | 56.      | £35,      | 1s.         | 3d.       | 82.      | £52, 7s. 4½d.    |           |
| 1792     | 0         | 0         |  | 57.      | 183½      | miles.      |           | 83.      | 140 acres.       |           |
| 18       | 0         | 0         |  | 58.      | 5         | hrs.        | 30 mins.  | 84.      | £2, 0s. 6d.      |           |
| 0        | 10        | 6         |  | 59.      | 21        | yards       | 0 feet    | 85.      | 15 bushels.      |           |
| 1        | 2         | 2         |  |          |           |             | 4 inches. | 86.      | £140.            |           |
| 1        | 8         | 0         |  | 60.      | 12        | suits.      |           | 87.      | £3, 2s. 6d.      |           |
| 4        | 5         | 3½        |  | 61.      | £7.       |             |           | 88.      | £114.            |           |
| 32       | 13        | 4         |  | 62.      | 9s.       | 0½d.        |           | 89.      | £14, 18s. 11½d.  |           |
| 21       | 0         | 0         |  | 63.      | £871,     | 14s.        | 4½d.      | 90.      | £3958, 6s. 8d.   |           |

## Exercise 12.

|           |                |                  |
|-----------|----------------|------------------|
| 18 days.  | 11. 20 days.   | 21. 72 days.     |
| 22 men.   | 12. 400 men.   | 22. 54 men.      |
| 150 men.  | 13. 14 days.   | 23. 7½d.         |
| 48 men.   | 14. 22½ lbs.   | 24. 60½ yds.     |
| 4 months. | 15. 5½ mouths. | 25. 8000 bricks. |
| 25 days.  | 16. 75 men.    | 26. 14 days.     |
| 18 days.  | 17. 10 men.    | 27. 40 men.      |
| 34 men.   | 18. 490 acres. | 28. 8½ days.     |
| 1 day.    | 19. 112 lbs.   | 29. 80 men.      |
| 15 days.  | 20. 200 yds.   | 30. 300 men.     |

## Exercise 13.

- |                                  |                                 |  |
|----------------------------------|---------------------------------|--|
| 1. 18 days.                      | 22. £25, 15s. 7d.               | 42. 181 acres 1 rod<br>30 $\frac{1}{2}$ per. |
| 2. 7 $\frac{1}{2}$ days.         | 23. 2 days.                     | 43. £107, 8s. 9d.                            |
| 3. 13 months.                    | 24. 162 bushels.                | 44. 45 mls. per hr.                          |
| 4. 26 $\frac{1}{2}$ days.        | 25. £1869.                      | 45. 643 $\frac{1}{4}$ miles.                 |
| 5. 67 cwts. 2 qrs.               | 26. 3738 sova.                  | 46. 6 minutes.                               |
| 6. £28.                          | 27. £3, 5s. 9d.                 | 47. 170 gals.                                |
| 7. £44, 13s. 9d.                 | 28. 96 yards.                   | 48. £57, 2s. 2 $\frac{1}{2}$ d.              |
| 8. £1490.                        | 29. 15 yards.                   | 49. 1 $\frac{1}{2}$ hours.                   |
| 9. £26, 12s.                     | 30. 24 men.                     | 50. 3 months.                                |
| 10. 14 days.                     | 31. £54, 3s. 2 $\frac{1}{2}$ d. | 51. £879, 3s. 4d.                            |
| 11. £14.                         | 32. £1, 10s.                    | 52. 170 qrs. 5 bua.                          |
| 12. 81 $\frac{1}{2}$ yards.      | 33. 15 men.                     | 53. 12 cwts. 3 qrs.                          |
| 13. £15, 5s. 3 $\frac{1}{2}$ d.  | 34. 108 men.                    | 54. 2 tons 3 cwts<br>3 qrs. 14 lbs.          |
| 14. £310.                        | 35. £96, 15s.                   | 55. 3 hrs. 52 mins.                          |
| 15. 9 days.                      | 36. 108 miles.                  | 56. 32 $\frac{1}{2}$ yards.                  |
| 16. £31, 5s.                     | 37. 52 $\frac{1}{2}$ miles.     | 57. 243 ft. 10 in.                           |
| 17. 34 chests.                   | 38. £3060, 15s. 6d.             | 58. 180 days.                                |
| 18. 18 yards.                    | 39. £1, 0s. 8 $\frac{1}{2}$ d.  | 59. 20 casks.                                |
| 19. £71, 8s. 11 $\frac{1}{2}$ d. | 40. 1s. 7 $\frac{1}{2}$ d.      | 60. 21 men.                                  |
| 20. 18 days.                     | 41. £3, 3s. 3d.                 |  |
| 21. 755 eggs.                    |                                 |  |

EXAMINATION QUESTIONS FOR V<sup>1</sup>.—SET I.

## Exercise 14.

- |                                    |   |
|------------------------------------|---|
| A1.                                | C1.                                     |
| 1. 1s. 2d.                         | 1. 9 men.                               |
| 2. 999,950.                        | 2. 135.                                 |
| 3. 27 lbs. 13 ozs.                 | 3. £91, 1s. 3 $\frac{1}{2}$ d.          |
| 4. 709 ac. 3 rds. 38 per.          | 4. 119 dys. 13 hrs. 6 min.              |
| 5. 91 dys. 21 hrs. 12 min. 12 sec. | 5. 5225 cwts. 3 qrs. 14 lbs. 14<br>ozs. |
| 6. 10s.                            | 6. 201 times.                           |

## B1.

- |  |  |
|--|--|
| 1. 2 qrs. 2 lbs. 8 ozs.                      | D1.  |
| 2. 126,840,000.                              | 1. 60 lbs.                                 |
| 3. 3 mls. 1 fur. 37 per. 2 $\frac{1}{2}$ yd. | 2. 2,436,750.                              |
| 4. 854 ozs. 14 dwts.                         | 3. £10, 4s. 11d.                           |
| 5. 332 $\frac{1}{2}$ yards.                  | 4. 7 ozs.                                  |
| 6. 14s. 8d.                                  | 5. 19 mls. 5 fur. 4 per. 3 yds.<br>2 feet. |
|  | 6. £28, 2s. 6d.                            |

## E1.

1. £30.
2. 755,760.
3. 1 ac. 3 rds. 7 per.
4. £5, 7s.
5. 527,040 min.
6. £1, 5s. 6d.

## F1.

1. £29, 17s. 4d.
2. 805,450.
3. 3 qrs. 25 lbs. 13 ozs.
4. 92 tons 3 qrs. 14 lbs.
5. 566,280 feet.
6. £16, 3s. 1½d.

## G1.

1. 15 hrs. 18 min.
2. 4,082,330.
3. 4s. 7d.
4. £17, 18s. 2½d.
5. 935,337 ins.
6. 8s. 10d.

## H1.

1. 8 cwts. 0 qrs. 14 lbs.
2. 36,492,119,010.
3. 1 ton 1 cwt. 3 qrs. 19 lbs.
4. 807 hrs. 6 min.
5. 65,554½ ft.
6. 30 miles.

## I1.

1. 20 medals.
2. 1013 and 2806 over.
3. 9 lbs. 8 oz. 15 dwts. 3 grs.
4. 2600 cwts. 3 qrs. 16 lbs.
5. 9663 farthings.
6. 52 lbs.

## J1.

1. £705, 12s.
2. 9910.

3. 3 fur. 26 per. 4½ yds.
4. 559 hrs. 50 min. 44 sec.
5. 401 ac. 1 rd. 9 per.
6. 10s.

## K1.

1. 32 yards.
2. 1013 and 2805 over.
3. 6 fur. 38 per. 4½ yds.
4. £159,832, 16s.
5. 85,093½.
6. 1693.

## L1.

1. £8, 13s. 4d.
2. 124,501,632,430.
3. £82, 1s. 3d.
4. 222 ac. 2 rds. 0 per.
5. 3,214,080 grs.
6. £1, 2s. 10½d.

## M1.

1. £5, 0s. 6d.
2. 653,600.
3. 1 cwt. 1 qr. 0 lbs. 11 ozs.
4. 1062 cwts. 2 qrs. 16 lbs.
5. 2748 feet.
6. 8 lbs. 11 ozs.

## N1.

1. £2, 15s. 1½d.
2. 25,200,400.
3. 2 mls. 4 fur. 3 per. 1 yd.
4. £1929, 13s. 4d.
5. 9289½ feet.
6. 13s. 6½d.

## O1.

1. 285 men.
2. 9108.
3. 65 pints.
4. £5268.
5. 31,543 lbs.
6. £10, 13s. 4d.

## P1.

1. £49, 12s.
2. 36,493,775,010.
3. 97 stones.
4. £680.
5. 1764 lbs.
6. £38.

## Q1.

1. 50.
2. 10,133 and 6455 over.
3. £8, 7s. 7d.
4. £798, 10s.
5. 3,083,190 gra.
6. £2, 0s. 6d.

## R1.

1. 8s. 4d.
2. 999,970.
3. 19 cwt. 1 qr. 9 lbs.

## 4. £319, 2s. 6d.

5. 1 ac. 3 rd. 6 per. 23 yds. 4 ft.
6. 2s. 3½ d.

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## S1.

1. £5, 0s. 6d.
2. 2,136,000.
3. 1s. 11d.
4. £74, 2s. 8d.
5. 144,000. grains.
6. 10s.

## T1.

1. 24 tons.
2. 429,305,334,400.
3. 16s. 6d.
4. £31,576, 16s.
5. 10,328,560. sq. yds.
6. £4, 1s. 1½ d.

EXAMINATION QUESTIONS FOR V<sup>1</sup>.—SET I

## Exercise 15.

## A2.

1. 8160 gra.
2. 18 ac. 1 rd. 33 per. 7 yds.  
4 ft. 126 in.
3. 27 men.
4. 6s. 6d.
5. £2, 7s. 4½ d.
6. £2, 3s. 9d.

## B2.

1. 5.
2. 12 c. yda. 20 c. ft. 206 c. in.
3. 75.
4. 475 ac. 1 rd. 24 per.
5. £6, 4s. 7d.
6. 80,190 ins.

## C2.

1. 203 yds. 1 qr. 3 nls.
2. 1d.
3. 3 fur. 24 per. 0 yds. 0 ft.
4. 1 cwt. 1 qr. 10 lbs.
5. 50 ozs.
6. 25,908,100.

## D2.

1. 24 tons 1 cwt. 0 qrs. 2  
11 ozs.
2. 17 ac. 3 rds. 29½ per.
3. 100.
4. 3 lbs. 9 ozs. 18 dwta. 1
5. 1.  
3½ d.

## E2.

1. £4, 16s.
2. 2 ac. 0 rds. 36 $\frac{7}{17}$  per.
3. £26, 17s. 8 $\frac{1}{2}$ d.
4. £2, 0s. 4d.
5. 160.
6. 5,901,452.

## F2.

1. £3, 19s. 9d.
2. 3.
3. 70.
4. 4 ac. 2 rds. 35 per. 7 yds.  
4 ft. 67 in.
5. £2, 19s. 5 $\frac{1}{2}$ d.
6. 4180.

## G2.

1. £44, 14s. 8d.
2. 42 $\frac{1}{2}$  grs.
3. 30 tons 14 cwts. 3 qrs. 3 lbs.
4. 80 times.
5. 40 yrs.
6. 44,055 ft.

## H2.

1. 47 yds. 1 ft. 1 in.
2. 80 times.
3. 2 cwts. 2 qrs. 23 lbs. 8 ozs.
4. £1, 9s. 2d.
5. £122.
6. £6, 12s. 10 $\frac{1}{2}$ d.

## I2.

1. 5 ac. 0 rd. 35 per. 4 yds. 8 ft.
2. 186 miles.
3. 12 ac. 2 rds. 24 per.
4. 7s. 10 $\frac{1}{2}$ d.
5. 4s.
6. 60 lbs.

## J2.

1. 34 yds. 0 ft. 7 in.
2. 660 times.

3. £1, 1s. 1d.
4. 3 lbs. 1 oz. 10 dwts.
5. £543, 5s. 11 $\frac{1}{4}$ d.
6. £1, 4s. 6d.

## K2.

1. 2,505,600 seconds.
2. 25 men.
3. 88 tons 5 cwts. 2 qrs. 24 lbs.
4. 240 lbs.
5. 152,946 in.
6. 206,500 grs.

## L2.

1. 73 lbs. 2 ozs.
2. £2, 5s. 1 $\frac{1}{4}$ d.
3. £5, 1s. 8 $\frac{3}{4}$ d. + 44.
4. £3, 8s.
5. £2, 12s. 6d.
6. 1 rd. 26 per. + 8.

## M2.

1. £1, 6s. 8d.
2. 260 acres.
3. 881 ac. 2 rds. 10 per.
4. 20 shirts.
5. £93, 10s.
6. 90061 seconds.

## N2.

1. 40,864,200.
2. 52 ac. 1 rd.
3. £7, 2s. 9 $\frac{1}{2}$ d.
4. £1315, 10s. 7 $\frac{1}{2}$ d.
5. £175, 9s. 4d.
6. 1007 cwts. 2 qrs. 10 lbs.

## O2.

1. 5 cwts. 1 qr. 11 lbs.
2. £55, 19s. 6 $\frac{1}{2}$ d.
3. 1075 florins.
4. 788 half-pounds.
5. 17 cwts. 2 qrs.
6. £266.

## P2

1. 33 ac. 2 rds. 30 per.
2. 1200 oranges.
3. 108 yards.
4. 1816 times.
5. 544 ac. 2 rds. 30 per.
6. £2,737,690.

## Q2

1. 363 ac. 0 rds. 31 per.
2. £27, 14s. 3d.
3. 13 ac. 3 rds. 1*1*/<sub>2</sub> per.
4. 304 bottles.
5. 3000 fourpences.
6. 15,340 feet.

## R2

1. 3s. 10*1*/<sub>2</sub>d.
2. 73,413*1*/<sub>2</sub> sq. yds.
3. 438, 6s. 3d.
4. 477 acres.
5. £86, 3s. 6d.
6. 10 lbs. 4 ozs. 5 dwts. 3 grs.

## S2

1. £421, 1s. 6d.
2. 3s. 9*1*/<sub>2</sub>d.
3. 996 guineas, 3 shillings.
4. 421 yds. 3 qrs. 3 nls.
5. 14*1*/<sub>2</sub> days.
6. £11, 11s.

## T2

1. £7, 13s. 9*1*/<sub>2</sub>d.
2. 48.
3. 45,507,696.
4. £15, 2s. 5*1*/<sub>2</sub>d.
5. 3840 steps.
6. 304 half-crowns.

## U2

1. 16s. 3d.
2. £34, 13s. 4d.

## 3. £3, 5s. 6d.

4. 4,309,575.

5. 262 tons 10 cwts.

6. 1648.

## V2

1. 72.
2. £2.
3. £4, 7s. 0*1*/<sub>2</sub>d. + 58.
4. 62 tons 9 cwts. 3 qrs. 3 lbs.
5. 48 spoons.
6. £5, 2s. 8d.

## W2

1. £37, 2s. 6d.
2. 462 three-pences.
3. 105,490 grs.
4. 4160 grs.
5. 27.
6. 2,678,400.

## X2

1. 220 times.
2. 20 suits.
3. 284 yds. 0 qrs. 2 nls.
4. 512 bottles.
5. 4 mls. 7 fur. 12 per. 3 yds.  
1 ft. 10 in.
6. 590 ac. 3 rds. 25 per.

## Y2

1. 0.
2. 6 ac. 1 rd. 5 per.
3. 7 cu. yds. 0 cu. ft. 351 cu. in.
4. 38 plots.
5. 31,109 lbs.
6. £2, 19s.

## Z2

1. 5664 times.
2. 42*1*/<sub>2</sub> grs.
3. £11, 16s. 3d.
4. 35 yards.
5. £990, 3s. 8*1*/<sub>2</sub>d.  
840 apples.

## Exercise 16.

|        |          |          |           |
|--------|----------|----------|-----------|
| 1. 14. | 9. 24.   | 17. 45.  | 25. 6.    |
| 2. 5.  | 10. 22.  | 18. 216. | 26. 26.   |
| 3. 6.  | 11. 4.   | 19. 5.   | 27. 1702. |
| 4. 2.  | 12. 3.   | 20. 182. | 28. 14.   |
| 5. 1.  | 13. 11.  | 21. 63.  | 29. 2.    |
| 6. 13. | 14. 47.  | 22. 28.  | 30. 2.    |
| 7. 8.  | 15. 189. | 23. 22.  |           |
| 8. 14. | 16. 267. | 24. 29.  |           |

## Exercise 17.

|                      |                       |                         |                             |                              |
|----------------------|-----------------------|-------------------------|-----------------------------|------------------------------|
| 1. $\frac{1}{5}$ .   | 7. $\frac{9}{13}$ .   | 13. $\frac{211}{691}$ . | 19. $\frac{20}{37}$ .       | 25. $\frac{43}{67}$ .        |
| 2. $\frac{3}{2}$ .   | 8. $\frac{11}{5}$ .   | 14. $\frac{2}{63}$ .    | 20. $\frac{6530}{12963}$ .  | 26. $\frac{45001}{570000}$ . |
| 3. $\frac{2}{11}$ .  | 9. $\frac{8}{13}$ .   | 15. $\frac{14}{15}$ .   | 21. $\frac{62}{175}$ .      | 27. $\frac{35}{144}$ .       |
| 4. $\frac{5}{6}$ .   | 10. $\frac{25}{25}$ . | 16. $\frac{26}{225}$ .  | 22. $\frac{13}{14}$ .       | 28. $\frac{3}{4}$ .          |
| 5. $\frac{12}{13}$ . | 11. $\frac{10}{13}$ . | 17. $\frac{8}{9}$ .     | 23. $\frac{13010}{14818}$ . | 29. $\frac{17}{16}$ .        |
| 6. $\frac{31}{32}$ . | 12. $\frac{21}{1}$ .  | 18. $\frac{8}{6}$ .     | 24. $\frac{15}{16}$ .       | 30. $\frac{11}{12}$ .        |

## Exercise 18.

|                       |                        |                        |                         |
|-----------------------|------------------------|------------------------|-------------------------|
| 1. $\frac{15}{2}$ .   | 6. $\frac{125}{8}$ .   | 11. $\frac{61}{11}$ .  | 16. $\frac{223}{9}$ .   |
| 2. $\frac{9}{10}$ .   | 7. $\frac{70}{4}$ .    | 12. $\frac{187}{21}$ . | 17. $\frac{4488}{19}$ . |
| 3. $\frac{131}{12}$ . | 8. $\frac{289}{10}$ .  | 13. $\frac{191}{19}$ . | 18. $\frac{8015}{14}$ . |
| 4. $\frac{93}{5}$ .   | 9. $\frac{371}{12}$ .  | 14. $\frac{402}{27}$ . | 19. $\frac{1682}{20}$ . |
| 5. $\frac{225}{11}$ . | 10. $\frac{811}{20}$ . | 15. $\frac{709}{35}$ . | 20. $\frac{5037}{44}$ . |

## Exercise 19.

|                     |                      |                       |                        |                         |
|---------------------|----------------------|-----------------------|------------------------|-------------------------|
| 1. $3\frac{3}{4}$ . | 5. $8\frac{1}{3}$ .  | 9. $7\frac{7}{8}$ .   | 13. $43\frac{7}{11}$ . | 17. $57\frac{11}{13}$ . |
| 2. $2\frac{3}{8}$ . | 6. $7\frac{1}{4}$ .  | 10. 100.              | 14. $25\frac{1}{13}$ . | 18. $3\frac{9}{2}$ .    |
| 3. 5.               | 7. $7\frac{1}{2}$ .  | 11. $4\frac{5}{6}$ .  | 15. $14\frac{13}{5}$ . | 19. $7\frac{13}{4}$ .   |
| 4. $5\frac{5}{7}$ . | 8. $10\frac{1}{3}$ . | 12. $25\frac{1}{2}$ . | 16. $63\frac{1}{7}$ .  | 20. $27\frac{5}{11}$ .  |

## Exercise 20.

1.  $\frac{1}{16}$ ;  $\frac{1}{8}$ ;  $\frac{3}{8}$ ;  $\frac{3}{4}$ ;  $\frac{10}{16}$ ;  $\frac{1}{12}$ ;  $\frac{3}{40}$ ;  $\frac{3}{16}$ ;  $\frac{2}{16}$ ;  $\frac{11}{16}$ ;  $\frac{1}{16}$ .
2.  $\frac{1}{6}$ ;  $\frac{1}{3}$ ;  $\frac{3}{4}$ ;  $\frac{1}{4}$ ;  $\frac{1}{5}$ ;  $\frac{11}{4}$ ;  $\frac{20}{48}$ ;  $\frac{9}{16}$ ;  $\frac{17}{48}$ ;  $\frac{7}{8}$ .
3.  $\frac{1}{8}$ ;  $\frac{3}{16}$ ;  $\frac{7}{8}$ ;  $\frac{39}{160}$ ;  $\frac{11}{16}$ ;  $\frac{91}{320}$ ;  $\frac{163}{160}$ .
4.  $\frac{7}{10}$ .
5.  $\frac{3}{2}$ .
6.  $\frac{17}{20}$ .
7.  $\frac{1}{1640}$ .
8.  $\frac{5}{8}$ ;  $\frac{6}{5}$ ;  $\frac{1}{2}$ ;  $\frac{15}{16}$ ;  $\frac{3}{80}$ ;  $\frac{7}{15}$ ;  $\frac{19}{16}$ ;  $\frac{39}{80}$ ;  $\frac{43}{80}$ ;  $\frac{13}{16}$ .

|  |                      |
|--|----------------------|
| 9. $\frac{1}{4}$ ; $\frac{1}{2}$ ; $\frac{3}{4}$ ; $\frac{5}{8}$ ; $\frac{11}{16}$ ; $\frac{13}{16}$ ; $\frac{11}{16}$ ; $\frac{13}{16}$ . |                      |
| 10. $\frac{7}{16}$ ; $\frac{5}{8}$ ; $\frac{3}{4}$ ; $\frac{11}{16}$ ; $\frac{13}{16}$ ; $\frac{11}{16}$ ; $\frac{13}{16}$ .               |                      |
| 11. $\frac{1}{16}$ .   | 15. $\frac{1}{8}$ .  |
| 12. $\frac{1}{16}$ .   | 16. $\frac{3}{8}$ .  |
| 13. $\frac{1}{16}$ .   | 17. $\frac{3}{16}$ . |
| 14. $\frac{1}{16}$ .   | 18. $\frac{1}{16}$ . |
|  | 22. $\frac{1}{16}$ . |

## Exercise 21.

|  |   |
|--|---|
| 1. 6s. 8d.   | 25. 2s. 6d.   |
| 2. 1s. 6d.   | 26. 1s. 6d.   |
| 3. 3s. 6d.   | 27. £2, 5s. 6d.   |
| 4. £1, 5s.   | 28. 9 ozs.  |
| 5. 1 lb. 2 ozs.  | 29. 3 days.   |
| 6. 3 days.   | 30. 13 lbs. 8 ozs.                                      |
| 7. 1 lb. 8 ozs.  | 31. 1 ton 15 cwt.                                       |
| 8. 15 cwt.   | 32. 2 cwt. 3 qrs. 16 lbs.                               |
| 9. 2 cwt. 3 qrs. 7 lbs.  | 33. 3 rds. 34 po. 21 yds. 4 ft. 72 in.                  |
| 10. 2 rds. 7 per. $8\frac{1}{2}$ yds.                          | 34. 18 hrs. 32 mins. $43\frac{7}{11}$ secs.             |
| 11. $7\frac{1}{2}$ hrs.  | 35. 494 acs. 2 rds. 7 po. 8 yds<br>2 ft. 36 in.         |
| 12. 200 acres.   | 36. 6 po. 1 yd. $1\frac{1}{8}$ in.                      |
| 13. 2 po. 2 yds. $2\frac{1}{4}$ ins.                           | 37. 6 sq. po. 5 yds. 6 ft. $6\frac{1}{4}$ in.           |
| 14. 2 sq. po. 11 sq. yds. 3 sq. ft.<br>$13\frac{1}{2}$ sq. in. | 38. 2 ft. $2\frac{1}{8}$ in.                            |
| 15. 1 ft. $6\frac{1}{4}$ in.                                   | 39. 6 sq. ft. 84 sq. in.                                |
| 16. 4 sq. ft. 96 sq. in.                                       | 40. 4 mls. 37 per. 4 yds. $1\frac{1}{2}$ in.            |
| 17. 1 fur. 5 ch. 3 yds. 2 ft.                                  | 41. 7 aca. 26 po. 20 yds. 1 ft. 72 in.                  |
| 18. 2 acs. 21 po. 20 yds. 1 ft.<br>72 in.                      | 42. 4 cwt. 1 qr. 14 lbs.                                |
| 19. 3 qrs. 18 lbs.   | 43. 2 cwt. 2 qrs. 23 lbs. 5 ozs.<br>$5\frac{1}{2}$ drs. |
| 20. 1 ton 9 cwt. 2 qrs. 14 lbs.<br>8 ozs. $4\frac{3}{4}$ drs.  | 44. 8 cwt. 7 lbs.                                       |
| 21. 1 ton 4 cwt. 5 st. 2 lbs.                                  | 45. 3 mls. 4 fur. 149 yds.                              |
| 22. 1 ml. 6 fur. 3 po. 4 yds. 2 ft.<br>3 in.                   | 46. 5 lbs. 10 ozs. $3\frac{1}{2}$ drs.                  |
| 23. 10 lbs. 7 ozs. $0\frac{1}{4}$ dr.                          | 47. 3 lbs. 2 ozs. $4\frac{1}{4}$ drs.                   |
| 24. 2s. 6d.  | 48. 2 tons 5 cwt. 17 lbs. 8 ozs.                        |
|  | 49. 7 fur. 10 yds. 1 ft. 6 in.                          |
|  | 50. 12 lbs. 5 ozs. $4\frac{1}{2}$ drs.                  |

## Exercise 22.

|        |         |          |
|--------|---------|----------|
| 1. 24. | 6. 36.  | 11. 90.  |
| 2. 30. | 7. 54.  | 12. 990. |
| 3. 24. | 8. 200. | 13. 420. |
| 4. 28. | 9. 120. | 14. 840. |
| 5. 60. |         | 15. 480. |

16. 16,800.

17. 720.

18. 60.

19. 120.

20. 72.

21. 180.

22. 180.

23. 840.

24. 432.

25. 840.

26. 5400.

27. 462.

28. 836.

29. 120,120.

30. 6,340,320.

## Exercise 23.

1.  $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$ .

2.  $\frac{10}{12}, \frac{9}{12}, \frac{7}{12}$ .

3.  $\frac{5}{60}, \frac{7}{60}, \frac{6}{60}$ .

4.  $\frac{25}{28}, \frac{25}{28}, \frac{25}{28}$ .

5.  $\frac{15}{20}, \frac{14}{20}, \frac{16}{20}$ .

6.  $\frac{55}{63}, \frac{54}{63}, \frac{63}{63}$ .

7.  $\frac{54}{36}, \frac{27}{36}, \frac{38}{36}$ .

8.  $\frac{9}{42}, \frac{9}{42}, \frac{20}{42}$ .

9.  $\frac{36}{60}, \frac{28}{60}, \frac{40}{60}$ .

10.  $\frac{72}{75}, \frac{74}{75}, \frac{75}{75}, \frac{78}{75}$ .

11.  $\frac{14}{120}, \frac{56}{120}, \frac{25}{120}, \frac{74}{120}$ .

12.  $\frac{54}{96}, \frac{40}{96}, \frac{78}{96}, \frac{88}{96}$ .

13.  $\frac{60}{24}, \frac{12}{24}, \frac{21}{24}$ .

14.  $\frac{30}{24}, \frac{21}{24}, \frac{8}{24}$ .

15.  $\frac{110}{150}, \frac{114}{150}, \frac{150}{150}$ .

16.  $\frac{153}{204}, \frac{144}{204}, \frac{204}{204}, \frac{24}{204}$ .

17.  $\frac{210}{240}, \frac{60}{240}, \frac{50}{240}, \frac{117}{240}$ .

18.  $\frac{60}{300}, \frac{168}{300}, \frac{150}{300}, \frac{85}{300}$ .

19.  $\frac{128}{192}, \frac{132}{192}, \frac{36}{192}, \frac{15}{192}$ .

20.  $\frac{240}{360}, \frac{90}{360}, \frac{75}{360}, \frac{106}{360}$ .

21.  $\frac{704}{2840}, \frac{240}{2840}, \frac{1540}{2840}, \frac{715}{2840}$ .

22.  $\frac{4}{5}$  greatest;  $\frac{1}{5}$  is least.23.  $\frac{4}{5}$  greatest;  $\frac{7}{12}$  least.24.  $\frac{5}{6}$  greatest;  $\frac{3}{5}$  least.

## Exercise 24.

1. 1.

2.  $1\frac{8}{9}$ .

3.  $2\frac{1}{5}$ .

4.  $2\frac{1}{63}$ .

5.  $2\frac{11}{24}$ .

6.  $1\frac{26}{33}$ .

7.  $2\frac{23}{24}$ .

8.  $2\frac{7}{5}$ .

9.  $1\frac{7}{90}$ .

10.  $2\frac{43}{60}$ .

11.  $2\frac{43}{120}$ .

12.  $2\frac{8}{5}$ .

13.  $2\frac{745}{772}$ .

14.  $16\frac{47}{695}$ .

15.  $29\frac{889}{990}$ .

16.  $1\frac{7}{72}$ .

17.  $1\frac{907}{990}$ .

18.  $2\frac{8}{5}$ .

19.  $3\frac{5}{36}$ .

20.  $2\frac{8}{5}$ .

21.  $3\frac{1}{20}$ .

22.  $1\frac{77}{120}$ .

23.  $3\frac{7}{60}$ .

24.  $2\frac{751}{3080}$ .

25.  $20\frac{18}{585}$ .

26.  $26\frac{407}{630}$ .

27.  $1\frac{47}{6}$ .

28.  $2\frac{37}{180}$ .

29.  $2\frac{1}{4}$ .

30.  $2\frac{5}{12}$ .

31.  $3\frac{1}{2}$ .

32.  $2\frac{17}{120}$ .

33.  $2\frac{193}{120}$ .

34.  $2\frac{5}{15}$ .

35.  $21\frac{009}{1386}$ .

36.  $14\frac{29}{210}$ .

37.  $29\frac{172}{315}$ .

38.  $13\frac{581}{1080}$ .

39.  $4\frac{57}{140}$ .

40.  $12\frac{74}{185}$ .

41.  $2\frac{1}{4}$ .

42.  $1\frac{4}{5}$ .

43.  $\frac{8}{5}$ .

44.  $1\frac{5}{6}$ .

45.  $1\frac{59}{112}$ .

46.  $1\frac{42}{5}$ .

47.  $2\frac{1}{11}$ .

48.  $2\frac{7}{15}$ .

49.  $2\frac{5}{4}$ .

50.  $2\frac{4}{9}$ .

51.  $11\frac{1}{8}$ .

|                          |                                  |                                  |
|--------------------------|----------------------------------|----------------------------------|
| 52. $14\frac{1}{28}$ .   | 58. $118\frac{5}{6}$ .           | 64. $7\frac{3}{8}$ .             |
| 53. $19\frac{1}{8}$ .    | 59. $18\frac{1}{5}$ .            | 65. $1\frac{2}{3}\frac{9}{10}$ . |
| 54. $14\frac{11}{180}$ . | 60. $21\frac{2}{9}$ .            | 66. $41\frac{7}{9}$ .            |
| 55. $44\frac{8}{9}$ .    | 61. $10\frac{1}{4}$ .            | 67. $26\frac{7}{10}$ .           |
| 56. $15\frac{11}{12}$ .  | 62. $12\frac{1}{5}$ .            | 68. $1\frac{8}{10}$ .            |
| 57. $17\frac{7}{12}$ .   | 63. $21\frac{1}{6}\frac{1}{2}$ . | 69. $22\frac{1}{2}\frac{1}{4}$ . |
|                          | 70. $5\frac{19}{25}$ .           |                                  |

## Exercise 25.

|                       |                        |                         |                         |
|-----------------------|------------------------|-------------------------|-------------------------|
| 1. $\frac{6}{7}$ .    | 13. $\frac{1}{18}$ .   | 25. $9\frac{1}{5}$ .    | 37. $488\frac{1}{4}$ .  |
| 2. $\frac{1}{7}$ .    | 14. $8\frac{1}{18}$ .  | 26. $26\frac{1}{2}$ .   | 38. $6\frac{7}{10}$ .   |
| 3. $\frac{47}{183}$ . | 15. $2\frac{1}{15}$ .  | 27. $21\frac{4}{9}$ .   | 39. $7\frac{1}{2}$ .    |
| 4. $\frac{1}{4}$ .    | 16. $1\frac{1}{90}$ .  | 28. $20\frac{4}{5}$ .   | 40. $12\frac{3}{5}$ .   |
| 5. $\frac{13}{50}$ .  | 17. $2\frac{1}{15}$ .  | 29. $63\frac{1}{4}$ .   | 41. $602\frac{1}{4}$ .  |
| 6. $\frac{47}{77}$ .  | 18. $3\frac{1}{14}$ .  | 30. $35\frac{1}{4}$ .   | 42. $5\frac{3}{20}$ .   |
| 7. $\frac{1}{143}$ .  | 19. $1\frac{1}{4}$ .   | 31. $99\frac{1}{144}$ . | 43. $94\frac{1}{20}$ .  |
| 8. $\frac{1}{20}$ .   | 20. $6\frac{2}{5}$ .   | 32. $112\frac{5}{8}$ .  | 44. $80\frac{5}{8}$ .   |
| 9. $\frac{4}{15}$ .   | 21. $1\frac{2}{3}$ .   | 33. $899\frac{9}{64}$ . | 45. $8\frac{5}{16}$ .   |
| 10. $\frac{1}{10}$ .  | 22. $3\frac{7}{12}$ .  | 34. $5\frac{5}{8}$ .    | 46. $99\frac{9}{4}$ .   |
| 11. $\frac{1}{105}$ . | 23. $1\frac{2}{3}$ .   | 35. $11\frac{7}{34}$ .  | 47. $100\frac{9}{40}$ . |
| 12. $\frac{5}{63}$ .  | 24. $1\frac{1}{8}$ .   | 36. $14\frac{7}{44}$ .  | 48. $7\frac{1}{16}$ .   |
|                       | 49. $88\frac{3}{40}$ . | 50. $1\frac{1}{48}$ .   |                         |

## Exercise 26.

|                        |                                  |                                  |  |
|------------------------|----------------------------------|----------------------------------|--|
| 1. $\frac{1}{4}$ .     | 13. $197\frac{1}{4}$ .           | 25. $5\frac{1}{4}$ .             | 37. 1.                                       |
| 2. $\frac{1}{4}$ .     | 14. $111\frac{1}{8}$ .           | 26. $\frac{2}{3}$ .              | 38. 1.                                       |
| 3. $\frac{4}{3}$ .     | 15. $9\frac{1}{8}$ .             | 27. $\frac{2}{7}$ .              | 39. $\frac{5}{8}$ .                          |
| 4. $\frac{1}{11}$ .    | 16. $3\frac{2}{3}$ .             | 28. $1\frac{2}{3}$ .             | 40. $2\frac{1}{10}$ .                        |
| 5. $27\frac{8}{9}$ .   | 17. 18.                          | 29. $2\frac{1}{2}$ .             | 41. $\frac{7}{10}$ .                         |
| 6. 96.                 | 18. 392.                         | 30. 90.                          | 42. $612\frac{1}{8}\frac{3}{4}\frac{1}{8}$ . |
| 7. $140\frac{1}{4}$ .  | 19. $139\frac{7}{8}$ .           | 31. 2.                           | 43. $35\frac{7}{16}$ .                       |
| 8. $178\frac{1}{8}$ .  | 20. $192\frac{1}{4}$ .           | 32. $\frac{1}{5}$ .              | 44. 55.                                      |
| 9. $55\frac{11}{4}$ .  | 21. $19\frac{2}{4}\frac{5}{8}$ . | 33. $\frac{11}{16}$ .            | 45. $\frac{11}{8}$ .                         |
| 10. $7\frac{5}{28}$ .  | 22. $2\frac{1}{8}$ .             | 34. $\frac{223}{480}$ .          | 46. $\frac{1}{8}$ .                          |
| 11. $6\frac{3}{4}$ .   | 23. $\frac{1}{4}$ .              | 35. $\frac{1}{8}\frac{1}{10}$ .  | 47. $1\frac{23}{100}$ .                      |
| 12. $685\frac{5}{4}$ . | 24. $\frac{1}{24}$ .             | 36. $\frac{47}{48}$ .            | 48. $\frac{47}{48}$ .                        |
|                        | 49. $1\frac{61}{1080}$ .         | 50. $1\frac{1}{8}\frac{1}{12}$ . |  |

## Exercise 27.

|                         |                                |                        |                            |
|-------------------------|--------------------------------|------------------------|----------------------------|
| 1. $\frac{27}{8}$ .     | 16. $\frac{24}{25}$ .          | 31. $\frac{7}{5}$ .    | 46. $5\frac{11}{15}$ .     |
| 2. $\frac{24}{5}$ .     | 17. $\frac{1}{2}\frac{1}{4}$ . | 32. $\frac{9}{15}$ .   | 47. 7.                     |
| 3. $4\frac{5}{8}$ .     | 18. 2.                         | 33. $14\frac{7}{12}$ . | 48. $30\frac{1}{3}$ .      |
| 4. $1\frac{5}{12}$ .    | 19. $1\frac{1}{5}$ .           | 34. $2\frac{5}{4}$ .   | 49. $3\frac{1}{10}$ .      |
| 5. $2\frac{3}{16}$ .    | 20. $\frac{1}{2}\frac{1}{4}$ . | 35. $5\frac{23}{44}$ . | 50. $1\frac{165}{196}$ .   |
| 6. $1\frac{2}{7}$ .     | 21. $\frac{1}{2}\frac{9}{7}$ . | 36. $1\frac{1}{11}$ .  | 51. $28\frac{4}{5}$ .      |
| 7. $2\frac{2}{15}$ .    | 22. $11\frac{3}{8}$ .          | 37. $\frac{8}{5}$ .    | 52. $3\frac{123}{280}$ .   |
| 8. $1\frac{11}{24}$ .   | 23. $7\frac{8}{11}$ .          | 38. $3\frac{17}{45}$ . | 53. $2\frac{2296}{2880}$ . |
| 9. $6\frac{7}{4}$ .     | 24. $\frac{5}{42}$ .           | 39. $1\frac{1}{2}$ .   | 54. $19\frac{9}{5}$ .      |
| 10. $1\frac{27}{25}$ .  | 25. $\frac{2}{27}$ .           | 40. $2\frac{17}{20}$ . | 55. $3\frac{344}{344}$ .   |
| 11. $2\frac{1}{2}$ .    | 26. $\frac{1}{10}$ .           | 41. $\frac{1}{15}$ .   | 56. $2\frac{24}{85}$ .     |
| 12. $\frac{8}{9}$ .     | 27. $\frac{887}{887}$ .        | 42. $\frac{4}{9}$ .    | 57. $4\frac{17}{18}$ .     |
| 13. $1\frac{9}{10}$ .   | 28. $1\frac{1}{47}$ .          | 43. $1\frac{2}{5}$ .   | 58. $14\frac{2}{15}$ .     |
| 14. $2\frac{5}{8}$ .    | 29. $19\frac{19}{32}$ .        | 44. $7\frac{7}{10}$ .  | 59. $9\frac{177}{337}$ .   |
| 15. $24\frac{15}{16}$ . | 30. $5\frac{3}{45}$ .          | 45. $3\frac{2}{3}$ .   | 60. $6\frac{142}{165}$ .   |

## MISCELLANEOUS QUESTIONS IN VULGAR FRACTIONS.

## Exercise 28.

|   |   |                              |
|---|---|------------------------------|
| 1. $\frac{5}{6}, \frac{10}{9}, \frac{5}{6}$ .                   | 14. $\frac{28}{5}$ .                            | 29. 34.                      |
| 2. $236\frac{7}{25}, 2195\frac{12}{13}$ ,<br>45, 385.           | 15. $11\frac{2}{5}\frac{5}{6}$ .                | 30. $11\frac{157}{188}$ .    |
| 3. $2\frac{301}{14}, 2\frac{909}{81},$<br>$11\frac{657}{112}$ . | 16. $\frac{7}{4}$ .                             | 31. $\text{£}3\frac{1}{2}$ . |
| 4. $4\frac{6}{10}, 2\frac{4}{5}, \frac{65}{40}$ .               | 17. $982\frac{3}{8}$ days.                      | 32. $\frac{9}{16}$ cwt.      |
| 5. $4\frac{8}{14}$ .  | 18. $1\frac{9}{2}$ .                            | 33. 13s. 9d.                 |
| 6. $1\frac{3}{4}$ .   | 19. $\frac{28}{30}$ .                           | 34. 2s. $5\frac{1}{4}$ d.    |
| 7. $1\frac{7}{12}$ .  | 20. $\frac{5}{6}$ .                             | 35. 11 hrs. 12 mins.         |
| 8. $\frac{1}{4}$ .  | 21. $\frac{5}{10}$ and $\frac{8}{10}$ .         | 36. £100, 8s. 5d.            |
| 9. £1, 10s.   | 22. $1\frac{7}{5}$ .                            | 37. $7\frac{24}{243}$ .      |
| 10. £4, 13s. 9d.  | 23. $4\frac{2}{3}$ .                            | 38. $30\frac{1}{5}$ .        |
| 11. 18s. $5\frac{1}{4}$ d.                                      | 24. $\frac{5}{24}$ .                            | 39. $36\frac{4}{7}$ .        |
| 12. $23\frac{9}{5}$ .   | 25. $\frac{9}{16}, \frac{1}{16}, \frac{1}{8}$ . | 40. $\frac{8}{7}$ .          |
| 13. $3\frac{8}{37}$ .   | 26. $\frac{27}{16}$ .                           | 41. $8\frac{5}{14}$ .        |
|   | 27. $1\frac{1}{3}$ .                            | 42. $9\frac{1}{7}$ .         |
|   | 28. $2\frac{4}{13}$ .                           | 43. $3\frac{23}{105}$ .      |

|                                  |                                  |   |
|----------------------------------|----------------------------------|---|
| 44. $\frac{7}{15}$ .             | 63. $38\frac{7}{15}$ .           | 82. $14\frac{2}{3}$ .                     |
| 45. $11\frac{1}{4}$ .            | 64. $2\frac{4}{7}$ .             | 83. $2\frac{2}{7}\frac{1}{4}$ .           |
| 46. $20\frac{1}{10}$ .           | 65. $89\frac{5}{8}$ .            | 84. 1.                                    |
| 47. $52\frac{3}{8}\frac{5}{6}$ . | 66. $5\frac{5}{8}$ .             | 85. $2\frac{1}{4}\frac{3}{5}$ .           |
| 48. 7.                           | 67. $53\frac{5}{11}$ .           | 86. $1\frac{2}{3}\frac{1}{4}$ .           |
| 49. 25.                          | 68. $411\frac{3}{8}$ .           | 87. $\frac{1}{8}$ .                       |
| 50. 1560.                        | 69. $25\frac{2}{3}\frac{7}{4}$ . | 88. $\frac{1}{3}\frac{1}{3}\frac{2}{3}$ . |
| 51. 18.                          | 70. $\frac{1}{3}$ .              | 89. $\frac{1}{12}\frac{2}{3}$ .           |
| 52. 3.                           | 71. $1\frac{1}{3}\frac{1}{8}$ .  | 90. $\frac{1}{8}\frac{1}{4}$ .            |
| 53. 2.                           | 72. $1\frac{1}{12}$ .            | 91. 10s.                                  |
| 54. 756.                         | 73. $1\frac{1}{3}\frac{3}{5}$ .  | 92. 5 yds. 0 ft. 9 in.                    |
| 55. $\frac{6}{123}$ .            | 74. $3\frac{2}{3}\frac{7}{10}$ . | 93. 3 rds. 10 po.                         |
| 56. $\frac{17}{148}$ .           | 75. $1\frac{1}{3}\frac{1}{4}$ .  | 94. £2.                                   |
| 57. $\frac{1769}{18278}$ .       | 76. 7.                           | 95. £1.                                   |
| 58. $\frac{1}{5}$ .              | 77. $\frac{1}{3}$ .              | 96. £3 nearly.                            |
| 59. $\frac{1}{2}\frac{1}{4}$ .   | 78. 25.                          | 97. 13s. $7\frac{1}{2}d$ .                |
| 60. $\frac{1}{1895}$ .           | 79. $\frac{2}{15}$ .             | 98. $\frac{1}{185}$ .                     |
| 61. $\frac{4}{7}$ .              | 80. $73\frac{1}{3}$ .            | 99. $\frac{1}{6}$ .                       |
| 62. $1\frac{1}{8}\frac{1}{5}$ .  | 81. 1.                           | 100. $\frac{3}{7040}$ .                   |

## Exercise 29.

|                          |                            |                              |
|--------------------------|----------------------------|------------------------------|
| 1. $\frac{399}{1000}$ .  | 5. $3\frac{1}{1000}$ .     | 9. $1\frac{369}{100000}$ .   |
| 2. $39\frac{97}{100}$ .  | 6. $5\frac{1}{15}$ .       | 10. $1\frac{1}{1000}$ .      |
| 3. $10\frac{99}{1000}$ . | 7. $77\frac{9}{10}$ .      | 11. $579\frac{76}{100000}$ . |
| 4. $\frac{391}{1000}$ .  | 8. $6\frac{2382}{10000}$ . | 12. $1\frac{1}{1000000}$ .   |

## Exercise 30.

1. .019; .0005; .378.  
 2. 13·9; .00739; .000059.  
 3. .0017; 1·396; .0000124.

## Exercise 31.

1. Five hundred thousandths, or five tenths.  
 2. Nine hundred and eighty thousandths, or ninety-eight hundredths.  
 3. Ninety-six thousandths.  
 4. Eight thousandths and nine hundred and sixty million.

5. Nine hundred and seventy-three units, eight hundred and six thousandths.
6. Thirty-two units, one hundred millionths.
7. One unit, one hundred and one thousandths, ten millionths.
8. One thousandth, one millionth, ten billionths.
9. Seven hundred and seven millionths.
10. Ten thousandths, one hundred and seventy-nine millionths, six hundred millionths.
11. Nine hundred and seventy-eight thousandths, sixty millionths.
12. Ninety-seven thousandths, eight hundred and twenty-four millionths.

### Exercise 32.

|             |              |
|-------------|--------------|
| 1. .015019. | 6. 318·6.    |
| 2. .700012. | 7. .70007.   |
| 3. 6·58.    | 8. .4.       |
| 4. .110047. | 9. .000080.  |
| 5. .000863. | 10. .613015. |

### Exercise 33.

|                              |                              |                                 |
|------------------------------|------------------------------|---------------------------------|
| 1. $\frac{1}{50}$ .          | 11. $\frac{1}{25}$ .         | 21. $15\frac{3}{16}$ .          |
| 2. $\frac{1}{40}$ .          | 12. $\frac{1}{8}$ .          | 22. $379\frac{477}{2000}$ .     |
| 3. $\frac{3}{40}$ .          | 13. $\frac{117}{200}$ .      | 23. $4\frac{3}{4000}$ .         |
| 4. $\frac{1}{125}$ .         | 14. $\frac{3}{250}$ .        | 24. $19\frac{77}{200}$ .        |
| 5. $\frac{3}{5}$ .           | 15. $\frac{1}{5}$ .          | 25. $7\frac{2}{3}\frac{1}{8}$ . |
| 6. $\frac{1}{125}$ .         | 16. $\frac{49}{500}$ .       | 26. $234\frac{8}{5}$ .          |
| 7. $\frac{3}{16}$ .          | 17. $\frac{117}{2000}$ .     | 27. $20\frac{78}{2000}$ .       |
| 8. $\frac{8471}{100000}$ .   | 18. $\frac{4329}{100000}$ .  | 28. $9991\frac{22}{125}$ .      |
| 9. $\frac{11}{100000}$ .     | 19. $\frac{21}{100000}$ .    | 29. $8\frac{79}{200}$ .         |
| 10. $\frac{17007}{400000}$ . | 20. $\frac{11407}{200000}$ . | 30. $76\frac{17}{2000}$ .       |

### Exercise 34.

|                              |                                |
|------------------------------|--------------------------------|
| 1. .5; .25; .125.            | 9. .8; .075; .3.               |
| 2. .4; .6; .7.               | 10. .5625; .078125; .21875.    |
| 3. .3125; .375; .125.        | 11. .072; .1425; .9125.        |
| 4. .024; .07125; .5625.      | 12. .85; .1; .175.             |
| 5. .95; .425; .2375.         | 13. .18·75; .179·875; .19·152. |
| 6. 19·75; 617·625; 19·056.   | 14. 86·024; 99·21875; 74·9225. |
| 7. 84·024; 79·15625; 94·425. | 15. .25; .375; .4.             |
| 8. .75; .625; .5.            | 16. .5; .8; .9.                |

|                               |                  |
|-------------------------------|------------------|
| 17. 5625 : 53125 : 125.       | 29. 472.         |
| 18. 76 : 0425 : 01875.        | 30. 14.3571428.  |
| 19. 18.75 : 19.4125 : 17.038. | 31. 185.         |
| 20. 49.1625 : 37.078125 :     | 32. 46.          |
| .09.021575.                   | 33. 3461536.     |
| 21. 1.                        | 34. 1633942, &c. |
| 22. 17.3.                     | 35. 0826531, &c. |
| 23. 428571.                   | 36. 03645.       |
| 24. 19.7.                     | 37. 004241, &c.  |
| 25. 3.72.                     | 38. 003616, &c.  |
| 26. 49.3076.                  | 39. 0650.        |
| 27. 428571.                   | 40. 01425.       |
| 28. 43.                       |                  |

**Exercise 35.**

|                  |                 |                  |
|------------------|-----------------|------------------|
| 1. 275.          | 11. 3.216.      | 21. 1.3083.      |
| 2. 9416.         | 12. 4.6875.     | 22. .0010416.    |
| 3. 2985416.      | 13. .00948, &c. | 23. .018.        |
| 4. 911581, &c.   | 14. .001136.    | 24. .008125.     |
| 5. 30568.        | 15. .0825.      | 25. .016122, &c. |
| 6. 01439.        | 16. .00378.     | 26. .19707, &c.  |
| 7. .00472, &c.   | 17. .1064.      | 27. 2.4341, &c.  |
| 8. 1.193415, &c. | 18. 1.5534, &c. | 28. .376.        |
| 9. 923.01298.    | 19. .175.       | 29. .0046875.    |
| 10. .225.        | 20. .77083.     | 30. 2685546875.  |

**Exercise 36.**

|  |  |
|--|--|
| 1. 9d.                                       | 13. 6 oza. 8 dramas.                       |
| 2. 7s. 3d.                                   | 14. 1 cwt. 1 qr. 19 lbs. 7 oz.             |
| 3. 13s. 7½d.                                 | 7 drs.                                     |
| 4. 13s. 9¾d.                                 | 15. 1s. 8½d.                               |
| 5. 13s. 6d.                                  | 16. £3, 10s. 11 $\frac{5}{12}$ d.          |
| 6. 3s. 6½d. nearly.                          | 17. 17s.                                   |
| 7. 6 cwts. 1 qr.                             | 18. 4s. 8½d.                               |
| 8. 3 roods 20 poles.                         | 19. 6s. 4½d.                               |
| 9. 4d.                                       | 20. 4s. 2½d.                               |
| 10. 3 fur. 32 poles 3 yds. 1 ft.<br>1½ in.   | 21. 1 lb. 12 oza. 9 $\frac{9}{12}$ d.      |
| 11. 7 hrs. 16 min. 30 sec.                   | 22. 3 tons 19 cwts.                        |
| 12. 13 cwts. 2 qrs. 17 lbs. 6<br>oz. 1 dram. | 23. $\frac{171}{100}$ in.                  |
|  | 24. 24 sq. yds. 1 ft. 11 $\frac{1}{2}$ in. |

5. Nine hundred and seventy-three units, eight hundred and six thousandths.
6. Thirty-two units, one hundred millionths.
7. One unit, one hundred and one thousandths, ten millionths.
8. One thousandth, one millionth, ten billionths.
9. Seven hundred and seven millionths.
10. Ten thousandths, one hundred and seventy-nine millionths, six hundred millionths.
11. Nine hundred and seventy-eight thousandths, sixty millionths.
12. Ninety-seven thousandths, eight hundred and twenty-four millionths.

### Exercise 32.

|             |              |
|-------------|--------------|
| 1. .015019. | 6. 318·6.    |
| 2. .700012. | 7. .70007.   |
| 3. 6·58.    | 8. 4.        |
| 4. .110047. | 9. .000080.  |
| 5. .000863. | 10. .613015. |

### Exercise 33.

|                             |                             |                                 |
|-----------------------------|-----------------------------|---------------------------------|
| 1. $\frac{1}{50}$ .         | 11. $\frac{1}{25}$ .        | 21. $15\frac{3}{10}$ .          |
| 2. $\frac{1}{40}$ .         | 12. $\frac{1}{5}$ .         | 22. $379\frac{477}{2000}$ .     |
| 3. $\frac{2}{40}$ .         | 13. $\frac{1}{200}$ .       | 23. $\frac{3}{4000}$ .          |
| 4. $\frac{1}{125}$ .        | 14. $\frac{3}{250}$ .       | 24. $19\frac{77}{200}$ .        |
| 5. $\frac{3}{8}$ .          | 15. $\frac{1}{5}$ .         | 25. $7\frac{1}{2}\frac{1}{5}$ . |
| 6. $\frac{3}{125}$ .        | 16. $\frac{49}{500}$ .      | 26. 234 $\frac{8}{9}$ .         |
| 7. $\frac{3}{10}$ .         | 17. $\frac{1171}{2000}$ .   | 27. $\frac{73}{20000}$ .        |
| 8. $\frac{8471}{10000}$ .   | 18. $\frac{4329}{10000}$ .  | 28. $9991\frac{22}{125}$ .      |
| 9. $\frac{1}{100000}$ .     | 19. $\frac{21}{100000}$ .   | 29. $8\frac{79}{200}$ .         |
| 10. $\frac{17007}{40000}$ . | 20. $\frac{11407}{20000}$ . | 30. $76\frac{17}{2000}$ .       |

### Exercise 34.

|                              |                               |
|------------------------------|-------------------------------|
| 1. .5; .25; .125.            | 9. .8; .075; .3.              |
| 2. .4; .6; .7.               | 10. .5625; .078125; .21875.   |
| 3. .3125; .375; .125.        | 11. .072; .1425; .9125.       |
| 4. .024; .07125; .5625.      | 12. .85; .1; .175.            |
| 5. .95; .425; .2375.         | 13. 18·75; 179·875; 19·152.   |
| 6. 19·75; 617·625; 19·056.   | 14. 86·024; 99·21875; 74·225. |
| 7. 84·024; 79·15625; 94·425. | 15. .25; .375; .4.            |
| 8. .75; .625; .5.            | 16. .5; .8; .9.               |

- |                              |                  |
|------------------------------|------------------|
| 17. .5625; .53125; .125.     | 29. .472.        |
| 18. .76; .0425; .61875.      | 30. 14.3571428.  |
| 19. 18.875; 19.8125; 17.038. | 31. .183.        |
| 20. 69.1625; 97.078125;      | 32. .46.         |
| .99.021875.                  | 33. .3461538.    |
| 21. .3.                      | 34. .166942, &c. |
| 22. 5.83.                    | 35. .052631, &c. |
| 23. .428571.                 | 36. .03648.      |
| 24. 19.7.                    | 37. .004241, &c. |
| 25. 5.72.                    | 38. .003616, &c. |
| 26. .923076.                 | 39. .0690.       |
| 27. .428571.                 | 40. .01425.      |
| 28. .43.                     |                  |

### Exercise 35.

- |                  |                 |                 |
|------------------|-----------------|-----------------|
| 1. .275.         | 11. 2.216.      | 21. 1.8083.     |
| 2. .9416.        | 12. 4.6875.     | 22. .0010416    |
| 3. 2.885416.     | 13. .00948, &c. | 23. .015.       |
| 4. .01581, &c.   | 14. .001136.    | 24. .003125.    |
| 5. .00568.       | 15. .0625.      | 25. .016122,    |
| 6. .01439.       | 16. .00378.     | 26. .12707, &c. |
| 7. .00472, &c.   | 17. .1054.      | 27. .24341, &c. |
| 8. .1193415, &c. | 18. 1.5524, &c. | 28. .375.       |
| 9. .923701298.   | 19. .175.       | 29. .0046875    |
| 10. .225.        | 20. .77083.     | 30. .2685546    |

### Exercise 36.

- |   |  |
|---|--|
| 1. 9d.  | 13. 6 ozs. 8 drams.                        |
| 2. 7s. 3d.  | 14. 1 cwt. 1 qr. 19 lbs.                   |
| 3. 15s. 7 $\frac{1}{2}$ d.                              | 7 drs.                                     |
| 4. 19s. 9 $\frac{1}{4}$ d.                              | 15. 1s. 8 $\frac{1}{2}$ d.                 |
| 5. 1 $\frac{1}{2}$ s. 7 $\frac{1}{2}$ d.                | 16. £3, 10s. 11 $\frac{5}{12}$ d.          |
| 6. 3s. 6 $\frac{1}{2}$ d. nearly.                       | 17. 17s.                                   |
| 7. 6 cwts. 1 qr.  | 18. 4s. 8 $\frac{1}{4}$ d.                 |
| 8. 3 roods 20 poles.                                    | 19. 6s. 4 $\frac{1}{2}$ d.                 |
| 9. 4 $\frac{1}{2}$ d.                                   | 20. 4s. 2 $\frac{1}{2}$ d.                 |
| 10. 3 fur. 32 poles 3 yds. 1 ft.<br>1 $\frac{1}{2}$ in. | 21. 1 lb. 12 ozs. 9 $\frac{1}{2}$ d.       |
| 11. 7 hrs. 16 min. 30 sec.                              | 22. 3 tons 19 cwts.                        |
| 12. 13 cwts. 2 qrs. 17 lbs. 6<br>ozs. 1 dram.           | 23. 1 $\frac{1}{2}$ in.                    |
|   | 24. 24 sq. yds. 1 ft. 11 $\frac{1}{2}$ yd. |
|   | 25. 9s.                                    |

|  |  |
|--|--|
| 18s. 10 $\frac{1}{2}$ d.                                 | 33. 13s.                                       |
| 1s. 10 $\frac{1}{2}$ d.                                  | 34. 11 $\frac{1}{2}$ d.                        |
| 3s. 1 $\frac{1}{2}$ d.                                   | 35. 2s. 6d.                                    |
| 1 bus. 1 pk. 3 qts. 1 $\frac{11}{12}$ gi.                | 36. 7s. 5 $\frac{1}{2}$ d.                     |
| 4 ac. 3 rds. 6 po. 16 yds.<br>8 ft. 66 $\frac{6}{5}$ in. | 37. 7 ozs. 3 $\frac{29}{32}$ drs.              |
| 4 $\frac{1}{2}$ s $\frac{1}{2}$ drs.                     | 38. 2 fur. 29 po. 3 yds. 4 $\frac{58}{12}$ in. |
| 1 per. 3 yds. 10 $\frac{1}{2}$ in.                       | 39. 5 ozs. 3 $\frac{5}{12}$ drs.               |
|  | 40. 2 yds. 2 ft. 1 $\frac{1}{2}$ in.           |

## Exercise 37.

- |                  |                           |
|------------------|---------------------------|
| 1. 23·3092.      | 16. 1651·65.              |
| 2. 161·1658.     | 17. 6·769005.             |
| 3. 238·114.      | 18. 322·62075.            |
| 4. 64·655.       | 19. 1379·53345.           |
| 5. 1911·197.     | 20. 1·86629.              |
| 6. 533·96291.    | 21. 918·98715.            |
| 7. 140·3615.     | 22. 8431·1900016.         |
| 8. 2·89778.      | 23. 263·7.                |
| 9. 1867·55891.   | 24. 942·1875.             |
| 10. 65·046.      | 25. 28·5015.              |
| 11. 600·8254.    | 26. 98·4 yards.           |
| 12. 4475·105045. | 27. 72·475902.            |
| 13. 2·4397464.   | 28. 505·7486.             |
| 14. £158·32.     | 29. 2 $\frac{147}{400}$ . |
| 15. ·59985.      | 30. 4477·5447914.         |

## Exercise 38.

- |               |                   |
|---------------|-------------------|
| 1. 445·9887.  | 16. 84·655.       |
| 2. 33·4891.   | 17. ·495.         |
| 3. 179·4635.  | 18. ·83562.       |
| 4. 555·517.   | 19. 293·227.      |
| 5. 234·9925.  | 20. 8·99472.      |
| 6. ·04816.    | 21. 29999·999997  |
| 7. ·0383.     | 22. £259·25.      |
| 8. 55·3.      | 23. ·0003767.     |
| 9. 106·9993.  | 24. £549·75.      |
| 10. 25·63321. | 25. 31·625 yards. |
| 11. 46·3675.  | 26. 9·99.         |
| 12. 4·976.    | 27. ·9215.        |
| 13. 2·3806.   | 28. 64·3472.      |
| 14. ·43876.   | 29. 2·6387.       |
| 15. ·232916.  | 30. 19·5828.      |

## Exercise 43.

- |                                  |                                      |
|----------------------------------|--------------------------------------|
| 1. £5.                           | 16. $270\frac{2}{9}$ days.           |
| 2. £4800.                        | 17. 12s.                             |
| 3. 3s. $5\frac{9}{16}$ d.        | 18. £448.                            |
| 4. £30, 11s. $4\frac{7}{10}$ d.  | 19. £2277, 1s. 8d.                   |
| 5. £1, 3s. $1\frac{1}{2}$ d.     | 20. £13, 15s.                        |
| 6. £321, 8s. $6\frac{2}{3}$ d.   | 21. £12,577, 10s. $7\frac{7}{10}$ d. |
| 7. £142, 6s. $9\frac{1}{2}$ d.   | 22. 1s. $8\frac{5}{12}$ d.           |
| 8. £44, 0s. 10d.                 | 23. 2s. $4\frac{1}{8}$ d.            |
| 9. $8\frac{1}{8}$ lbs.           | 24. £16, 10s. 8d.                    |
| 10. £168, 17s. $9\frac{1}{2}$ d. | 25. £193, 0s. $10\frac{1}{3}$ d.     |
| 11. $105\frac{1}{8}$ yards.      | 26. 11s. 3d.                         |
| 12. £135, 16s. 3d.               | 27. £245.                            |
| 13. £36, 13s. 4d.                | 28. $15\frac{5}{8}$ acres.           |
| 14. £733, 6s. 8d.                | 29. 6s. 3d.                          |
| 15. 6700 lbs.                    | 30. £3333, 6s. 8d.                   |

## Exercise 44.

| £   | s. | d.                  | £   | s. | d.                  | £   | s. | d.                  |
|-----|----|---------------------|-----|----|---------------------|-----|----|---------------------|
| 1.  | 0  | 13 11 $\frac{1}{2}$ | 25. | 25 | 8 4                 | 49. | 1  | 10 10               |
| 2.  | 1  | 7 11                | 26. | 26 | 8 8                 | 50. | 2  | 6 3                 |
| 3.  | 2  | 1 10 $\frac{1}{2}$  | 27. | 27 | 9 0                 | 51. | 3  | 1 8                 |
| 4.  | 2  | 15 10               | 28. | 28 | 9 4                 | 52. | 3  | 17 1                |
| 5.  | 3  | 9 9 $\frac{1}{2}$   | 29. | 29 | 9 8                 | 53. | 4  | 12 6                |
| 6.  | 4  | 3 9                 | 30. | 30 | 10 0                | 54. | 5  | 7 11                |
| 7.  | 4  | 17 $8\frac{1}{2}$   | 31. | 31 | 10 4                | 55. | 6  | 3 4                 |
| 8.  | 5  | 11 8                | 32. | 32 | 10 8                | 56. | 3  | 8 5 $\frac{1}{4}$   |
| 9.  | 8  | 17 2 $\frac{1}{4}$  | 33. | 32 | 4 2 $\frac{1}{4}$   | 57. | 3  | 16 0 $\frac{1}{2}$  |
| 10. | 9  | 16 10 $\frac{2}{3}$ | 34. | 33 | 3 8 $\frac{1}{4}$   | 58. | 4  | 3 7 $\frac{1}{4}$   |
| 11. | 10 | 16 6 $\frac{2}{3}$  | 35. | 34 | 3 2 $\frac{1}{4}$   | 59. | 4  | 11 3                |
| 12. | 11 | 16 3                | 36. | 35 | 2 9                 | 60. | 4  | 18 10 $\frac{1}{3}$ |
| 13. | 12 | 15 11 $\frac{1}{2}$ | 37. | 36 | 2 3 $\frac{1}{4}$   | 61. | 5  | 6 5 $\frac{1}{2}$   |
| 14. | 13 | 15 7 $\frac{1}{2}$  | 38. | 37 | 1 9 $\frac{1}{4}$   | 62. | 5  | 14 0 $\frac{1}{4}$  |
| 15. | 14 | 15 3 $\frac{3}{4}$  | 39. | 38 | 1 3 $\frac{3}{4}$   | 63. | 6  | 1 8                 |
| 16. | 15 | 15 0                | 40. | 39 | 0 10                | 64. | 17 | 9 6 $\frac{2}{3}$   |
| 17. | 13 | 10 11 $\frac{1}{2}$ | 41. | 17 | 9 4 $\frac{1}{2}$   | 65. | 18 | 10 1 $\frac{1}{2}$  |
| 18. | 14 | 6 10 $\frac{1}{3}$  | 42. | 17 | 17 10 $\frac{1}{2}$ | 66. | 19 | 10 8 $\frac{1}{4}$  |
| 19. | 15 | 2 9 $\frac{1}{4}$   | 43. | 18 | 14 11               | 67. | 20 | 11 3                |
| 20. | 15 | 18 9                | 44. | 19 | 3 5 $\frac{1}{4}$   | 68. | 21 | 11 9 $\frac{1}{4}$  |
| 21. | 16 | 14 8 $\frac{1}{4}$  | 45. | 19 | 11 11 $\frac{1}{2}$ | 69. | 22 | 12 4 $\frac{1}{2}$  |
| 22. | 17 | 10 7 $\frac{1}{2}$  | 46. | 20 | 0 5 $\frac{3}{4}$   | 70. | 23 | 12 11 $\frac{1}{2}$ |
| 23. | 18 | 6 6 $\frac{2}{3}$   | 47. | 20 | 9 0                 | 71. | 24 | 13 6 $\frac{2}{3}$  |
| 24. | 19 | 2 6                 | 48. | 0  | 15 5                | 72. | 18 | 3 6 $\frac{2}{3}$   |

|              |             |              |
|--------------|-------------|--------------|
| 34. 234·375. | 40. 3.      | 46. 125.     |
| 35. 545·6.   | 41. 2·28.   | 47. 640,000. |
| 36. 8.       | 42. ·0095.  | 48. 3122.    |
| 37. 40.      | 43. ·00005. | 49. ·02.     |
| 38. 240.     | 44. ·0763.  | 50. 6·056.   |
| 39. ·00125.  | 45. ·008.   |              |

## Exercise 42.

|                            |  |
|----------------------------|--|
| 1. ·050625.                | 37. 4·6875.                                |
| 2. $\frac{1}{5}$ .         | 38. ·0125.                                 |
| 3. ·875.                   | 39. ·0018.                                 |
| 4. 4·001.                  | 40. 6·39047, &c.                           |
| 5. 68.                     | 41. ·2301587.                              |
| 6. 2812·5.                 | 42. 125.                                   |
| 7. 5·8.                    | 43. ·06324, &c.                            |
| 8. 4·49793.                | 44. 1487·25.                               |
| 9. 23·66318.               | 45. ·000036.                               |
| 10. 4·5 times.             | 46. ·30388349, &c.                         |
| 11. 250.                   | 47. 3404.                                  |
| 12. 112·5.                 | 48. ·00227.                                |
| 13. 16·632.                | 49. ·274249, &c.                           |
| 14. 17·8609375 and 14·697. | 50. 5·6.                                   |
| 15. 4·08.                  | 51. ·149218, &c.                           |
| 16. 2260 times.            | 52. 3·225.                                 |
| 17. ·0000152.              | 53. ·01.                                   |
| 18. ·298828, &c.           | 54. 3·83.                                  |
| 19. 75·1.                  | 55. ·05.                                   |
| 20. 1009·6.                | 56. 1·05.                                  |
| 21. ·2, 2, 2, and ·00002.  | 57. ·165625.                               |
| 22. ·0023.                 | 58. £4, 6s. 6 $\frac{1}{2}$ d.             |
| 23. $\frac{1}{80}$ .       | 59. £3, 6s. 4 $\frac{1}{2}$ d.             |
| 24. ·642857 $\dot{1}$ .    | 60. £25, 7s. 1 $\frac{1}{2}$ d.            |
| 25. 19999·98.              | 61. 4 tons 12 cwts. 3 qrs.                 |
| 26. ·000015625.            | 62. £1, 8s. 9d. nearly.                    |
| 27. 10·025.                | 63. 2 tons 1 cwt. 0 qrs. 17 lbs.<br>8 ozs. |
| 28. ·23.                   | 64. £6187, 10s.                            |
| 29. 3020.                  | 65. ·5859375; ·85714 $\dot{2}$ .           |
| 30. ·00016.                | 66. 78·7888.                               |
| 31. 3125.                  | 67. 1·8599.                                |
| 32. ·04895, &c.            | 68. 9·99.                                  |
| 33. 12·3.                  | 69. 39999·96.                              |
| 34. 70.                    | 70. ·0585.                                 |
| 35. $\frac{2}{3}$ .        |  |
| 36. ·17578, &c.            |  |

|     | <i>£</i> | <i>s.</i> | <i>d.</i> |  | <i>£</i> | <i>s.</i> | <i>d.</i> |    | <i>£</i> | <i>s.</i> | <i>d.</i> |     |
|-----|----------|-----------|-----------|--|----------|-----------|-----------|----|----------|-----------|-----------|-----|
| 10. | 887      | 7         | 11        |  | 17.      | 2114      | 8         | 9½ | 24.      | 162       | 8         | 5½  |
| 11. | 1154     | 8         | 0         |  | 18.      | 1340      | 14        | 8  | 25.      | 296       | 11        | 3   |
| 12. | 1307     | 16        | 3         |  | 19.      | 1844      | 4         | 10 | 26.      | 248       | 2         | 1½  |
| 13. | 1546     | 13        | 9         |  | 20.      | 2461      | 0         | 0  | 27.      | 2620      | 6         | 7½  |
| 14. | 2374     | 3         | 4         |  | 21.      | 2199      | 7         | 6  | 28.      | 380       | 8         | 6½  |
| 15. | 1652     | 1         | 5½        |  | 22.      | 128       | 4         | 7½ | 29.      | 18        | 0         | 11½ |
| 16. | 2789     | 5         | 0         |  | 23.      | 190       | 12        | 6  | 30.      | 6         | 16        | 8   |

## Exercise 47.

|     | <i>£</i> | <i>s.</i> | <i>d.</i> |  | <i>£</i> | <i>s.</i> | <i>d.</i> |    | <i>£</i> | <i>s.</i> | <i>d.</i> |     |
|-----|----------|-----------|-----------|--|----------|-----------|-----------|----|----------|-----------|-----------|-----|
| 1.  | 1,390    | 10        | 0         |  | 21.      | 15,667    | 12        | 0  | 41.      | 2,438     | 11        | 11½ |
| 2.  | 7,491    | 15        | 0         |  | 22.      | 19,242    | 6         | 0  | 42.      | 7,623     | 18        | 9   |
| 3.  | 12,334   | 0         | 0         |  | 23.      | 3,814     | 16        | 0  | 43.      | 11,108    | 15        | 7½  |
| 4.  | 778      | 17        | 6         |  | 24.      | 18,415    | 16        | 0  | 44.      | 12,192    | 19        | 8½  |
| 5.  | 1,526    | 16        | 0         |  | 25.      | 17,036    | 17        | 0  | 45.      | 9,206     | 18        | 10½ |
| 6.  | 7,936    | 3         | 0         |  | 26.      | 25,612    | 4         | 0  | 46.      | 4,237     | 16        | 7   |
| 7.  | 7,314    | 0         | 0         |  | 27.      | 19,468    | 7         | 0  | 47.      | 26,422    | 10        | 0   |
| 8.  | 7,096    | 14        | 0         |  | 28.      | 2,924     | 11        | 6  | 48.      | 30,874    | 0         | 0   |
| 9.  | 8,533    | 7         | 0         |  | 29.      | 9,174     | 0         | 6  | 49.      | 44,435    | 2         | 6   |
| 10. | 12,281   | 10        | 0         |  | 30.      | 8,601     | 18        | 0  | 50.      | 22,878    | 0         | 4½  |
| 11. | 13,162   | 12        | 0         |  | 31.      | 4,398     | 19        | 6  | 51.      | 7,460     | 6         | 9   |
| 12. | 2,324    | 16        | 0         |  | 32.      | 7,261     | 8         | 6  | 52.      | 82,285    | 17        | 6   |
| 13. | 6,111    | 12        | 0         |  | 33.      | 13,429    | 0         | 0  | 53.      | 50,853    | 19        | 0   |
| 14. | 11,656   | 18        | 0         |  | 34.      | 7,623     | 18        | 9  | 54.      | 41,196    | 6         | 8   |
| 15. | 16,957   | 16        | 0         |  | 35.      | 2,649     | 6         | 3  | 55.      | 44,435    | 2         | 6   |
| 16. | 12,829   | 15        | 0         |  | 36.      | 11,108    | 15        | 7½ | 56.      | 350,835   | 0         | 0   |
| 17. | 8,322    | 0         | 0         |  | 37.      | 8,641     | 13        | 4  | 57.      | 144,128   | 0         | 7   |
| 18. | 2,104    | 1         | 0         |  | 38.      | 24,664    | 9         | 2  | 58.      | 701,670   | 0         | 0   |
| 19. | 12,915   | 1         | 0         |  | 39.      | 27,428    | 12        | 6  | 59.      | 446,482   | 12        | 0   |
| 20. | 19,247   | 16        | 0         |  | 40.      | 26,427    | 18        | 4  | 60.      | 1,297,152 | 5         | 3   |

## Exercise 48.

|     | <i>£</i> | <i>s.</i> | <i>d.</i> |  | <i>£</i> | <i>s.</i> | <i>d.</i> |       | <i>£</i> | <i>s.</i> | <i>d.</i> |      |
|-----|----------|-----------|-----------|--|----------|-----------|-----------|-------|----------|-----------|-----------|------|
| 1.  | 440      | 17        | 5·2       |  | 11.      | 1164      | 0         | 5·63  | 21.      | 1         | 12        | 9½   |
| 2.  | 876      | 16        | 3·4       |  | 12.      | 808       | 6         | 5·87  | 22.      | 21        | 1         | 7·68 |
| 3.  | 553      | 14        | 0·6       |  | 13.      | 710       | 4         | 6½    | 23.      | 27        | 6         | 4    |
| 4.  | 912      | 11        | 8·83      |  | 14.      | 965       | 5         | 10·87 | 24.      | 9         | 6         | 0·56 |
| 5.  | 600      | 2         | 3·08      |  | 15.      | 1261      | 8         | 1½    | 25.      | 1,212     | 3         | 9½   |
| 6.  | 736      | 8         | 1½        |  | 16.      | 2         | 8         | 6½    | 26.      | 1,212     | 3         | 9½   |
| 7.  | 897      | 1         | 4·66      |  | 17.      | 3         | 12        | 10·12 | 27.      | 96,998    | 10        | 6    |
| 8.  | 1184     | 12        | 6         |  | 18.      | 144       | 7         | 6     | 28.      | 5,997     | 14        | 7·87 |
| 9.  | 627      | 10        | 9·37      |  | 19.      | 173       | 18        | 1½    | 29.      | 185       | 17        | 6·88 |
| 10. | 499      | 5         | 2½        |  | 20.      | 11        | 19        | 8½    | 30.      | 36,453    | 9         | 2·42 |

## Exercise 49.

|     | £   | s. | d.               |     | £     | s. | d.               |     | £    | s. | d.              |
|-----|-----|----|------------------|-----|-------|----|------------------|-----|------|----|-----------------|
| 1.  | 18  | 15 | 0                | 24. | 116   | 19 | 7·9              | 47. | 115  | 13 | 8·1             |
| 2.  | 801 | 4  | 11 $\frac{1}{4}$ | 25. | 186   | 0  | 10               | 48. | 63   | 6  | 5·1             |
| 3.  | 233 | 16 | 0                | 26. | 331   | 4  | 2·3              | 49. | 207  | 18 | 9 $\frac{1}{3}$ |
| 4.  | 24  | 6  | 8                | 27. | 366   | 17 | 2·9              | 50. | 14   | 0  | 7·4             |
| 5.  | 479 | 12 | 0 $\frac{1}{4}$  | 28. | 966   | 8  | 6                | 51. | 38   | 13 | 2·3             |
| 6.  | 153 | 2  | 4·2              | 29. | 123   | 15 | 10 $\frac{1}{4}$ | 52. | 467  | 10 | 9·9             |
| 7.  | 48  | 7  | 6                | 30. | 91    | 12 | 10 $\frac{1}{2}$ | 53. | 918  | 10 | 7 $\frac{1}{4}$ |
| 8.  | 105 | 0  | 3                | 31. | 1028  | 6  | 10 $\frac{1}{2}$ | 54. | 13   | 9  | 9               |
| 9.  | 51  | 15 | 7 $\frac{1}{2}$  | 32. | 339   | 3  | 0                | 55. | 14   | 8  | 1               |
| 10. | 24  | 9  | 4 $\frac{1}{2}$  | 33. | 4986  | 8  | 6·84             | 56. | 683  | 17 | 7·3             |
| 11. | 515 | 19 | 4 $\frac{1}{2}$  | 34. | 120   | 6  | 9 $\frac{1}{2}$  | 57. | 120  | 1  | 3               |
| 12. | 727 | 5  | 2 $\frac{1}{2}$  | 35. | 24    | 13 | 5 $\frac{1}{4}$  | 58. | 10   | 18 | 9               |
| 13. | 136 | 10 | 0                | 36. | 73    | 19 | 9                | 59. | 320  | 11 | 7 $\frac{1}{2}$ |
| 14. | 4   | 0  | 5 $\frac{1}{4}$  | 37. | 1     | 5  | 1 $\frac{1}{4}$  | 60. | 60   | 13 | 2               |
| 15. | 18  | 6  | 8                | 38. | 7     | 19 | 4 $\frac{1}{2}$  | 61. | 195  | 17 | 4               |
| 16. | 60  | 12 | 7·8              | 39. | £1174 | 16 | 9·2              | 62. | 20   | 1  | 3               |
| 17. | 18  | 12 | 9                | 40. | 57    | 7  | 1 $\frac{1}{2}$  | 63. | 53   | 19 | 9 $\frac{1}{2}$ |
| 18. | 152 | 7  | 10·2             | 41. | 47    | 15 | 8·3              | 64. | 372  | 5  | 7 $\frac{1}{2}$ |
| 19. | 38  | 2  | 5 $\frac{3}{4}$  | 42. | 132   | 18 | 5 $\frac{1}{4}$  | 65. | 296  | 6  | 1·9             |
| 20. | 12  | 16 | 3                | 43. | 5795  | 17 | 2                | 66. | 67   | 7  | 6               |
| 21. | 21  | 18 | 4 $\frac{3}{4}$  | 44. | 101   | 7  | 3 $\frac{3}{4}$  | 67. | 1435 | 18 | 6·6             |
| 22. | 49  | 5  | 9 $\frac{1}{2}$  | 45. | 557   | 19 | 11 $\frac{1}{2}$ | 68. | 115  | 10 | 3·2             |
| 23. | 140 | 18 | 4                | 46. | 469   | 2  | 7 $\frac{1}{2}$  | 69. | 1233 | 8  | 8·4             |

70. £568, 6s. 4·8d.

## Exercise 50.

1. £1, 7s. 1 $\frac{1}{2}$ d. + £5, 15s. 7 $\frac{1}{2}$ d. + £1, 11s. 6d.  
Total, £8, 14s. 3d.
2. 7s. 3 $\frac{3}{4}$ d. + 8s. 5 $\frac{3}{4}$ d. + 3 $\frac{3}{4}$ d. + 3s. 4d. Total, 19s. 5 $\frac{1}{2}$ d.
3. £1, 0s. 1 $\frac{1}{2}$ d. + 6s. 4 $\frac{1}{2}$ d. + £1, 18s. 0 $\frac{1}{4}$ d. Total, £3, 4s. 6 $\frac{1}{2}$ d.
4. £110, 0s. 0d. + 7s. 6 $\frac{1}{2}$ d. + £8, 7s. 6d. + 1s. 3 $\frac{3}{4}$ d.  
Total, £118, 16s. 4 $\frac{1}{2}$ d.
5. 9s. 11 $\frac{1}{2}$ d. + 12s. 4d. + 3s. 6 $\frac{3}{4}$ d. + 16s. 3d. Total, £2, 2s. 1d.
6. 16s. 6d. + 6s. 6 $\frac{3}{4}$ d. + 16s. 6 $\frac{3}{4}$ d. + 18s. 8d.  
Total, £2, 18s. 3 $\frac{1}{2}$ d.
7. £6, 18s. 0d. + £1, 19s. 0d. + £12, 0s. 6d. + 8s. 1 $\frac{3}{4}$ d.  
Total, £21, 5s. 7 $\frac{3}{4}$ d.

8. £1, 5s. 4 $\frac{1}{2}$ d. + 3s. 6d. + 19s. 3d. + £1, 4s. 6d.

Total, £3, 12s. 7 $\frac{1}{2}$ d.

9. £6, 9s. 6d. + £1, 8s. 6 $\frac{1}{2}$ d. + £4, 7s. 6d. + 18s. 9d.

Total, £13, 4s. 3 $\frac{1}{2}$ d.

### Exercise 51.

|                                  |                                    |                       |
|----------------------------------|------------------------------------|-----------------------|
| 1. £485, 1s. 9d.                 | 14. £185, 12s. 10 $\frac{3}{4}$ d. | 28. 35 gallons.       |
| 2. £150, 10s. 0d.                | 15. £1350, 14s. 0 $\frac{3}{4}$ d. | 29. 10.               |
| 3. £650, 16s. 8d.                | 16. £50, 13s. 10 $\frac{1}{2}$ d.  | 30. £50, 5s. 0d.      |
| 4. £500, 0s. 6d.                 | 17. £29, 14s. 6 $\frac{3}{4}$ d.   | 31. 56 sq. perches.   |
| 5. £92, 7s. 1 $\frac{1}{2}$ d.   | 18. £306, 3s. 9d.                  | 32. 5s. 10d.          |
| 6. £89, 2s. 6 $\frac{1}{2}$ d.   | 19. £2072, 7s. 9d.                 | 33. 1 $\frac{2}{3}$ . |
| 7. £12, 2s. 1 $\frac{1}{2}$ d.   | 20. £428, 11s. 10 $\frac{1}{2}$ d. | 34. '0003731.         |
| 8. £468, 15s. 0d.                | 21. £1205, 1s. 5 $\frac{1}{2}$ d.  | 35. 125 acres 1 rood. |
| 9. £16, 5s. 6 $\frac{3}{4}$ d.   | 22. £2150, 17s. 4d.                | 36. 97 spoons.        |
| 10. £723, 5s. 4 $\frac{1}{2}$ d. | 23. £307, 8s. 10 $\frac{1}{2}$ d.  | 37. 960 yards.        |
| 11. £622, 16s. 0d.               | 24. 4s. 8d.                        | 38. 1.                |
| 12. £19, 19s. 3 $\frac{1}{2}$ d. | 25. £1, 2s. 8d.                    | 39. 128.              |
| 13. £1810, 13s. 6d.              | 26. 85,910 sq. yds.                | 40. See Proportion.   |
|                                  | 27. 60 men.                        |                       |

### EXAMINATION EXERCISES FOR V<sup>2</sup>. SET I.

#### A.

1. 1 $\frac{1}{2}$ s.  
2. 6 per. 2 yds. 1 ft.  
    1 in.  
3. 30 yds.  
4. 2s. 6d.  
5. £13, 3s. 1d.  
6. 21,326 $\frac{1}{2}$  sq. yds.

#### B.

1. 1 $\frac{1}{2}$ d.  
2. 65 days.  
3. 1 $\frac{1}{2}$ .  
4. 20.  
5. 47 acres.  
6. '002369.

#### C.

1. 4s.  
2. 6d.  
3. £2, 10s. 10 $\frac{3}{4}$ d.  
4. '00036.  
5. 15s. 7 $\frac{1}{2}$ d.  
6. '5416.

#### D.

1. '00288.  
2. £141, 10s. 9 $\frac{3}{4}$ d.  
3. 88,046 per. 3 yds.  
4. 2:30 P.M.  
5. 6 hrs.  
6. 437:52.

#### E.

1. 427083.  
2. 12 $\frac{1}{2}$ s.  
3. 1s. 8 $\frac{1}{2}$ d.  
4. '000000011271.  
5. 2 dys. 1 hr. 13  
    mins. 16 secs.  
6. 64.
- F.
1. 719 $\frac{3}{4}$ .  
2. 1174 acs. 1 rd. 20  
    per. 25 yds.  
3. 5s.

4. 9s. 8 $\frac{1}{2}$ d.  
5. £36, 15s.

6. '02.

#### G.

1. 105:3266.  
2. £385, 10s. 1 $\frac{1}{2}$ d.  
3. £2456, 13s. 6 $\frac{3}{4}$ d.  
4.  $\frac{1}{2}$ .  
5. £6, 15s. 6 $\frac{3}{4}$ d.  
6. £121, 18s. 9d. de-  
    creased.

#### H.

1. 437 $\frac{1}{2}$ , 480, 7000,  
    5760.  
2. £9, 0s. 1 $\frac{3}{4}$ d.  
3. £2, 10s. 5d.  
4. 17 mins. 25 secs.  
5. £2, 9s.  
6. £16, 15s. 3 $\frac{3}{4}$ d.

| I.                                      | M.                             | Q.                                      |
|---|--------------------------------|---|
| 0, 1s. 1·35d.                           | 1. £764, 17s. 11d.             | 1. $4\frac{8}{15}$ .                    |
| 570 yards.                              | 2. 105·5554.                   | 2. 137 yrs. 296 dys.<br>20 hrs. 4 mins. |
| 125.                                    | 3. $41\frac{1}{2}\text{d}.$    | 3. $2\frac{241}{50}d.$                  |
| 261, 8s. $1\frac{1}{2}d.$               | 4. 2941 $\frac{1}{2}$ .        | 4. $4\frac{7}{8}\text{d}.$              |
| qr. 14 lbs.                             | 5. 16 hrs.                     | 5. 11 hrs. 12 mins.                     |
|   | 6. $13\frac{1}{2}$ .           | 6. 15s. $3\frac{3}{4}d.$                |
| N.                                      |                                | R.                                      |
| J.                                      | 1. 1 cwt. 1 qr. 14 lbs.        | 1. $\frac{1}{2}$ .                      |
| , 13s. 1·5d.                            | 2. ·375, ·714285,              | 2. 1000.                                |
| 1375.                                   | ·1875.                         | 3. £217, 18s. 10d.                      |
| $\frac{7}{8}$ days.                     | 3. £54, 5s. $0\frac{1}{2}d.$   | 4. 4.                                   |
| $\frac{3}{4}\frac{1}{2}\frac{1}{2}$ .   | 4. 1073·9285714.               | 5. $1\frac{7}{3}$ .                     |
| $\frac{3}{4}$ yds.                      | 5. $3\frac{1}{4}\frac{1}{2}$ . | 6. £55, 14s. 6d.                        |
| horses.                                 | 6. £1000.                      |   |
| K.                                      | O.                             | S.                                      |
| 12, 1s. $8\frac{1}{2}d.$                | 1. 304.                        | 1. 1 cwt. 3 qrs. 14 lbs.                |
| tons 2 cwts. 2                          | 2. 3·593.                      | 2. £11, 9s. $4\frac{1}{2}d.$            |
| qrs. 14 lbs.                            | 3. 13.                         | 3. $17\frac{1}{4}\frac{1}{2}$ acs.      |
| cwts. 2 qrs. 7 lbs.                     | 4. 1 day 23 hrs. 2             | 4. £100, 3s. 10d.                       |
| . 1 $\frac{1}{2}$ d.                    | mins. $15\frac{1}{2}$ secs.    | 5. ·1648736.                            |
| 3.                                      | 5. ·000022752.                 | 6. ·5625.                               |
| 2, 6s. $10\frac{1}{2}d.$                | 6. $2\frac{4}{5}$ .            |   |
| L.                                      | P.                             | T.                                      |
| acs. 3 rds. 7 per.                      | 1. $\frac{1}{5}\frac{1}{5}$ .  | 1. ·887.                                |
| $\frac{1}{2}$ sq. yds.                  | 2. ·0027.                      | 2. £112, 0s. 3·18d.                     |
| cwts. 3 qrs. $25\frac{1}{2}\frac{1}{2}$ | 3. 32 cwts. 0 qrs.             | 3. £3, 18s. 9d.                         |
| lbs.                                    | 16 lbs.                        | 4. 15 days.                             |
| 1164, 0s. 5·6d.                         | 4. 63 coats.                   | 5. £6, 3s. $9\frac{1}{2}d.$             |
| 7.                                      | 5. 586 $\frac{2}{3}$ .         | 6. $1\frac{1}{2}$ .                     |
| 95, 11s. $10\frac{1}{2}d.$              | 6. $\frac{4}{7}\frac{1}{5}$ .  |   |

EXAMINATION EXERCISES FOR V<sup>2</sup>. SET II.

| A 2.                        | C 2.                          | E 2.  |
|-----------------------------|-------------------------------|---|
| 14, 3s. $7\frac{3}{4}d.$    | 1. £295,166, 13s. 4d.         | 4. Invert the divisor<br>and proceed as in<br>Multiplication. |
| 1 men.                      | 2. 9s. $7\frac{1}{2}d.$       | 5. $5\frac{1}{2}v.$   |
| 5, 15s. $1\frac{1}{2}d.$    | 3. $4\frac{8}{9}d.$           |   |
| 10.                         | 4. 14,213·8.                  |   |
| $\frac{1}{2}$ .             | 5. ·285416.                   |   |
| B 2.                        | D 2.                          |   |
| 1,493,050,510.              |                               | 1. 9108.  |
| $3\frac{1}{4}\frac{1}{2}$ . |                               | 2. $1\frac{1}{2}d.$   |
| 710, 9s. $8\frac{1}{2}d.$   | 1. £57, 1s. $10\frac{1}{2}a.$ | 3. £79, 18s. 3d.  |
| 245.                        | 2. £2, 15s. $10\frac{1}{2}d.$ | 4. $\frac{7}{12}v.$   |
| 39, 4s. $4\frac{1}{2}d.$    | 3. £11, 1s. $3\frac{1}{2}d.$  | 5. 4 miles.   |

## F2.

1. 82284 ft.
2. £9, 10s. 6d.
3. £54543, 6s.
4. 14*ft.*
5. £3807, 17s. 4*d.*

## G2.

1. 8*ft.*
2. £2957, 7s. 10*½d.*
3. £44, 15s. 5*½d.*
4. 5*ft.*
5. 48 men.

## H2.

1. £3059, 18s. 8d.
2. 150 men.
3. 2.
4. 42 days.
5. £58, 3s. 9d.

## I2.

1. 108 miles.
2. 24.
3. £31,720, 6s. 8d.
4. 95 tons 11 cwta  
3 qrta 7 lbs.
5. 1 ac. 3 rds. 21 per.  
1 yd. 6 ft. 108 in.

## J2.

1. 1*ft.*
2. £5036, 8s. 3*½d.*
3. 2 cwta. 2 qrta. 3 lbs.  
8 oza.
4. *ft.*
5. 0004879.

## K2.

1. £1024, 13s. 4d.
2. 18*ft.*
3. £1, 14s. 7*½d.*
4. 101.
5. 8'01.

## L2.

1. 9.
2. 862*½* plots.
3. £1, 5s. 10*½d.*
4. £18,856, 6s. 8d.
5. 45'78888.

## M2.

1. 4*ft.*
2. £20, 1s. 8d.
3. 4356000 yds.
4. £1, 19s. 0*½d.*
5. 2*ft.*

## N2.

1. 14*ft.*
2. 7 cwta. 8 qrta. 22  
lbs.
3. *ft.*
4. 1'235.
5. 10 ozs.

## O2.

1. £8576, 16s. 5*½d.*
2. 100 acrea.
3. 1*ft.*
4. '875.
5. 4'001.

## P2.

1. £6, 8s. 6*½d.*
2. '1.
3. *ft.*
4. £4, 10s. 3*·5d.*
5. 11 ac. 0 rds. 17  
per. 47 yds.

## Q2.

1. 1*ft.*
2. 864 doz.
3. £1024, 13s. 4d.
4. '68.
5. 2812'5.

## R2.

1. 9*ft.*
2. £2231, 11s. 1*½d.*
3. £10, 13s. 10*½d.*
4. £267, 6s. 3d.
5. *ft.*

## S2.

1. *ft.*
2. £79, 12s.
3. 3 acs. 1 rd. 14 per.  
7 yds. 4 ft. 72 in.
4. £653, 18s. 9*½d.*
5. 4'08

## T2.

1. £11,992, 15s.
2. 26 lba.
3. 3*ft.*
4. £30, 11s. 4*½d.*
5. 2260 times.

## U2.

1. 31,536,000 se
2. 3048.
3. £18, 12s. 2*·4d.*
4. 8s. 9d.
5. 384 lbs.

## V2.

1. 6 yds. 8 ft. 3*in.*
2. '00018.
3. 27 lba.
4. 566 ac. 3 rd  
per. 22*½* yd
5. 1*ft.*

## W2.

1. £12, 8s. 8*½d.*
2. £115, 13s. 6d
3. 37'7789.
4. 1*ft.*
5. 8 days.

## X2.

1. 3s. 10d.
2. £88, 19s. 4*½d.*
3. 185416.
4. 15*ft.*
5. 7 mls. 1 fur. 3  
0 yds. 2 ft.

## Y2.

1. £407, 16s. 1*·2d.*
2. 9 men.
3. *ft.*
4. 1'235.
5. 70 ozs.

## Z2.

1. '83.
2. £56.
3. 2 rds. 18 per. 8
4. £16, 7s. 2*½d.*
5. 5s. 4*½d.*

## ANSWERS.

### CIRCULATING DECIMALS.

#### Exercise 1.

- |   |   |   |   |  |                    |                     |
|---|---|---|---|--|--------------------|---------------------|
| 1. $\frac{1}{3}$ .                                  | 2. $\frac{4}{7}$ .                        | 3. $\frac{5}{7}$ .                      | 4. $\frac{2}{3}$ .                        | 5. $\frac{3}{5}$ .                       | 6. $\frac{2}{9}$ . | 7. $\frac{7}{10}$ . |
| 8. $\frac{1}{3} \frac{1}{3} \dots$ .                | 9. $\frac{4}{7} \frac{1}{7} \dots$ .      | 10. $\frac{1}{3} \frac{2}{3} \dots$ .   | 11. $\frac{2}{3} \frac{1}{3} \dots$ .     | 12. $\frac{1}{3} \frac{2}{3} \dots$ .    |                    |                     |
| 13. $4 \frac{8}{19} \frac{8}{19} \dots$ .           | 14. $5 \frac{1}{3} \frac{1}{3} \dots$ .   | 15. $9 \frac{1}{2} \frac{1}{2} \dots$ . | 16. $16 \frac{1}{4} \frac{1}{4} \dots$ .  | 17. $93 \frac{1}{3} \frac{1}{3} \dots$ . |                    |                     |
| 18. $79 \frac{1}{9} \frac{1}{9} \dots$ .            | 19. $1 \frac{9}{19} \frac{9}{19} \dots$ . | 20. $1 \frac{1}{3} \frac{1}{3} \dots$ . | 21. $3 \frac{1}{18} \frac{1}{18} \dots$ . | 22. $\frac{1}{3} \frac{1}{3} \dots$ .    |                    |                     |
| 23. $2 \frac{1}{3} \frac{1}{5} \frac{1}{5} \dots$ . | 24. $5 \frac{1}{5} \frac{1}{5} \dots$ .   |   |   |  |                    |                     |

#### Exercise 2.

- |   |   |
|---|---|
| 1. 7 per. 3 yds. 1 ft. $7\frac{1}{2}$ in.                               | 2. 2 mls. 7 fur. 26 per. $3\frac{3}{4}$ yds.                      |
| 3. 1 rd. 22 po. 18 yds. 8 ft. 72 in.                                    | 4. 8 cwts. 3 qrs. 14 lbs. 15 ozs.                                 |
| $14\frac{8}{19} \frac{8}{19} \dots$ drs.                                | 5. 23 lbs. 1 oz. $15\frac{1}{9} \frac{1}{9} \dots$ drs.           |
| 7. 3 tons 18 cwts. 2 qrs. 24 lbs. 14 ozs. $3\frac{1}{2}$ drs.           | 8. 8 cwts. 3 qrs.   |
| 11 lbs. 13 ozs. $11\frac{1}{11} \frac{1}{11} \dots$ drs.                | 9. 2 fur. 38 per. 1 yd.   |
| $3\frac{1}{11} \frac{1}{11} \dots$ drs.                                 | 10. 3 ac. 19 per.   |
| 24 yds. 8 ft. $125\frac{5}{19} \frac{5}{19} \dots$ in.                  | 11. 29 lbs. $13\frac{1}{11} \frac{1}{11} \dots$ drs.              |
| $13\frac{1}{11} \frac{1}{11} \dots$ drs.                                | 12. 3 lbs. 11 ozs.  |
| 13. 314 ac. 1 rd. 31 per. 3 yds. 3 ft. $36\frac{1}{2}$ in.              | 14. 4 tons  |
| 13 cwts. 2 qrs. 21 lbs. 11 ozs. $1\frac{6}{11} \frac{6}{11} \dots$ drs. | 15. 2 stones 13 lbs. 5 ozs.                                       |
| $13\frac{1}{11} \frac{1}{11} \dots$ drs.                                | 16. 4 rds. 1 per. 18 yds. $43\frac{5}{19} \frac{5}{19} \dots$ in. |
| 9 ozs. $3\frac{4}{5} \frac{4}{5} \dots$ drs.                            | 17. 23 st. 9 lbs.   |
| 20. £13, 4s. $2\frac{1}{2}$ d.  | 18. £5, 6s. $9\frac{1}{2}$ d.                                     |
|   | 19. 2 furlongs $14\frac{1}{2} \frac{1}{2} \dots$ per.             |

### ADDITION AND SUBTRACTION.

#### Exercise 3.

- |                   |                         |                       |
|-------------------|-------------------------|-----------------------|
| 1. 3.499524160.   | 2. 884.01126.           | 3. 273.7892105948382. |
| 4. 421.0021385.   | 5. 532.98645.           | 6. 2.708992082.       |
| 7. 1299.32937300. | 8. 496.904828299947111. | 9. 444.8086076.       |
| 10. 856.91596.    | 11. 2.78152516.         | 12. 1777.32035851.    |
| 13. 1443.3748566. | 14. 396.0025.           | 15. 878.0645.         |

## Exercise 4.

- |                   |                   |                   |                  |
|-------------------|-------------------|-------------------|------------------|
| 1. 77138 + .....  | 2. 6314           | 3. 4095 + .....   | 4. 33591 + ..... |
| 5. 425            | 6. 4923 + .....   | 7. 82609 + .....  | 8. 49493 + ..... |
| 9. 4883 + .....   | 10. 51418 + ..... | 11. 66438 + ..... |                  |
| 12. 9631 + .....  | 13. 7004 + .....  | 14. 11197 + ..... |                  |
| 15. 17535         | 16. 11260 + ..... | 17. 13069 + ..... |                  |
| 18. 11973 + ..... | 19. 7534 + .....  | 20. 15232 + ..... |                  |
| 21. 12885 + ..... | 22. 8563 + .....  | 23. 9046 + .....  |                  |
| 24. 12304 + ..... |                   |                   |                  |

MISCELLANEOUS QUESTIONS ON FRACTIONS,  
PRACTICE, AND PROPORTION.

## Exercise 5.

- |   |   |   |   |
|---|---|---|---|
| 1. 3 rods 32 poles.   | 2. 2 inches.                                    | 3. 10s. 10d.                                | 4. 189 $\frac{1}{2}$ yards                  |
| 5. 49 yrs. 19 days 6 hrs. 20 min.   | 6. 12 cwts. 26 lbs, 9 ozs. 9 $\frac{1}{2}$ drs. |   |   |
| 7. 19s. 2 $\frac{1}{2}$ d.  | 8. 16s. 6 $\frac{1}{2}$ d.                      | 9. $1\frac{1}{2}$ s.                        | 10. $1\frac{2}{3}\frac{1}{4}$ s.            |
| 11. 16s. 11 $\frac{1}{2}$ d.  | 12. $\frac{1}{2}$ s.                            | 13. $\frac{1}{4}$ s.                        | 14. 26, 6s.                                 |
| 15. 3 fur. 37 poles $4\frac{1}{2}$ yds.   | 16. 2 $\frac{1}{2}$ cwt.                        | 17. $\frac{1}{3}\frac{1}{2}\frac{1}{3}$ s.  | 18. $1\frac{1}{2}\frac{1}{3}\frac{1}{2}$ s. |
| 19. $\frac{4}{5}$ s.  | 20. £1, 19s. 11d.                               | 21. 1 bush. 2 pks. 1 pt.                    | 22. 3 mls. 4 fur. 8 pls.                    |
| 23. 1, 8s. 5 $\frac{1}{2}$ d.   | 24. 60 $\frac{1}{2}$ s.                         | 25. $\frac{1}{2}$ s. and $\frac{1}{7}$ s.   | 26. $4\frac{1}{2}\frac{1}{2}$ s. hrs.       |
| 27. 6 $\frac{1}{2}\frac{1}{2}$ s. bushels.  | 28. 226 $\frac{1}{2}$ acres.                    | 29. $\frac{1}{2}$ s.                        | 30. $1\frac{1}{2}$ s.                       |
| 31. 10s.  | 32. 623 $\frac{1}{2}\frac{1}{2}$ s. acres.      | 33. 15s. 3 $\frac{1}{2}$ d.                 | 34. 12s. 1 $\frac{1}{2}$ d.                 |
| 35. £10,300, 8s. 10 $\frac{1}{2}$ d.  | 36. 60 feet.                                    | 37. 8 $\frac{1}{2}\frac{1}{2}$ s. bushels.  | 38. 23 $\frac{1}{2}\frac{1}{2}$ s.          |
| 39. 3 $\frac{1}{2}\frac{1}{2}$ s.   | 40. $\frac{1}{2}\frac{1}{2}$ s.                 | 41. 33 $\frac{1}{2}\frac{1}{2}$ s.          | 42. $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s.  |
| 43. 21 $\frac{1}{2}$ s.   | 44. 9.  | 45. £3, 3s. 3 $\frac{1}{2}\frac{1}{2}$ d.   | 46. £30, 18s. 5 $\frac{1}{2}$ d.            |
| 47. $\frac{1}{2}\frac{1}{2}$ s.   | 48. $1\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s.     | 49. $1\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s. | 50. $\frac{1}{2}\frac{1}{2}$ s.             |
| 51. $2\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s.   | 52. 6 $\frac{1}{2}$ s.                          | 53. $\frac{1}{2}\frac{1}{2}$ s.             | 54. 1.                                      |
| 55. 298828 + .....  | 56. 25.63 bushels.                              | 57. 00015625.                               |   |
| 58. 10.025.   | 59. .808.                                       | 60. .318.                                   | 61. .3125.                                  |
| 62. $\frac{1}{2}\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s.; $\frac{1}{2}\frac{1}{2}$ s.; $\frac{1}{2}\frac{1}{2}$ s. | 63. 12.3.                                       | 64. 2.09367 + .....                         | 65. $\frac{1}{2}$ s. and $\frac{1}{4}$ s.   |
| 66. .017073; $\frac{1}{2}\frac{1}{2}\frac{1}{2}\frac{1}{2}$ s.  | 67. 184624, &c.                                 | 68. 94 $\frac{1}{2}$ mls.                   | 69. .00003140625.                           |
| 70. .28.  | 71. £4, 17s. 5 $\frac{1}{2}$ 75d.               | 72. £17, 19s. 7 $\frac{1}{2}$ d.            | 73. 6s. 7 $\frac{1}{2}$ d.                  |
| 74. £645, 5s. 3 $\frac{1}{2}$ d.  | 75. £4000.                                      | 76. £200.                                   | 77. 2s. 10d.                                |
| 78. £3012, 10s.   | 79. 4s. 8 $\frac{1}{2}$ d.                      | 80. £270.                                   | 81. 60 $\frac{1}{2}\frac{1}{2}$ s. yds.     |
| 82. £210.   | 83. £20,446, 4s. 3 $\frac{1}{2}$ d.             | 84. £11,110, 18s. 10 $\frac{1}{2}$ d.       | 85. £4588, 13s. 9 $\frac{1}{2}$ d.          |
| 86. £24,239, 15s. 11d.  | 87. £437, 4s. 8 $\frac{1}{2}$ d.                | 88. £2185, 8s. 6 $\frac{1}{2}$ d.           |   |
| 89. £114,417, 17s. 9 $\frac{1}{2}$ d.   | 90. £193.                                       | 91. £8, 3s. 6 $\frac{1}{2}$ d.              | 92. 3s. 2 $\frac{1}{2}$ d.                  |
| 93. £115, 8s. 4 $\frac{1}{2}$ d.  | 94. £169, 7s. 8 $\frac{1}{2}$ d.                |   | 95. 14s. 9 $\frac{1}{2}$ d.                 |
| 96. £281, 4s. 5 $\frac{1}{2}$ d.  | 97. £40, 4s. 2d.                                | 98. £95, 17s. 6 $\frac{1}{2}$ d.            |   |
| 99. £183, 0s. 6 $\frac{1}{2}$ d.  | 100. £161, 7s. 3d.                              | 101. £325, 11s. 6 $\frac{1}{2}$ d.          |   |
| 102. £258, 17s. 6d  | 103. 8 $\frac{1}{2}\frac{1}{2}$ d.              | 104. £19, 18s. 5 $\frac{1}{2}$ d.           |   |

105. £912, 15s. 10d.      106. £11, 1s. 9d.      107. £66, 9s. 0*½*d.  
 108. £54, 13s. 9d.      109. £7, 18s. 7*½*s*½*d.      110. 3*½*.      111. 17578 + .....  
 112. £721, 4s.      113. 0125.      114. 0018.      115. 6·39047 + .....  
 116. 2301587.      117. £227, 14s. 2d.      118. 06324 + .....  
 119. 88704 ozs.      120. 000036.      121. 30388349 + .....  
 122. 1*½*.      123. £2, 16s.      124. 1487·25.      125. 001.  
 126. 1943488.      127. 3*⅓*; 1*⅓*; 1*⅓*.      128. 05625.  
 129. 3·413617564459148.      130. 5517 + .....      131. 1 ton 19 cwts.  
 3 qrs. 10 lbs. 8 ozs.      132. 4442*⅔*.      133. 1*⅓*; 1*⅓*; 1*⅓*.  
 134. 142857.      135. 2·9049663860274.      136. 5363 + .....  
 137. 1 ml. 3 fur. 4 per. 2 yds. 2*½* in.      138. 1*⅓*; 1*⅓*; 1*⅓*.  
 139. 2819047.      140. 278006 + .....      141. 2*⅓* days.  
 142. 1*⅓* days.      143. 4 min.      144. 24 days.      145. 1*⅓* of a day.  
 146. 1*⅓* day.      147. 4*⅓* days.      148. 4*⅓* days.      149. £1875.  
 150. 5*⅓* minutes.
- 

## COMPOUND PROPORTION.

### Exercise 6.

- |                              |                         |                       |                             |
|------------------------------|-------------------------|-----------------------|-----------------------------|
| 1. 87 <i>½</i> acres.        | 2. 8 days.              | 3. 4 <i>⅓</i> days.   | 4. 15 days.                 |
| 5. £10, 12s. 9 <i>½</i> d.   | 6. 15 men.              | 7. £8, 6s. 8d.        | 8. 60 reapers.              |
| 9. £5, 4s. 4 <i>⅓</i> d.     | 10. 12 cwts. 2 qrs.     | 11. £54, 5s.          | 12. 12 days.                |
| 13. £29, 6s. 3 <i>⅓</i> d.   | 14. 8 men.              | 15. 5 <i>½</i> lbs.   | 16. £18, 10s. 4 <i>⅓</i> d. |
| 17. 9 days.                  | 18. 109 <i>½</i> acres. | 19. £250.             | 20. 24 <i>½</i> days.       |
| 21. 3 per cent.              | 22. 607 <i>½</i> feet.  | 23. 3s. 9d.           | 24. 1s. 3d.                 |
| 26. 12 <i>½</i> months.      | 27. £38, 8s.            | 28. 4000 horses.      | 29. £57, 3s.                |
| 30. 12 men.                  | 31. 6 lbs.              | 32. £11, 13s. 4d.     | 33. 8 men.                  |
| 34. 10 horses.               | 35. 28 horses.          | 36. 21 days.          | 37. 18 men.                 |
| 38. 14 persons.              | 39. 9 men.              | 40. 5 hours.          | 41. £33, 1s. 6d.            |
| 42. 10 <i>⅓</i> days.        | 43. 11 days.            | 44. 81 men.           | 45. £21, 7s. 6d.            |
| 46. £109, 14s. 9 <i>½</i> d. | 47. 21 wks.             | 48. £7, 10s.          | 49. £50.                    |
| 50. £154, 3s. 4d.            | 51. 20 <i>⅓</i> hrs.    | 52. 660 men.          | 53. 66 days.                |
| 54. 12 <i>½</i> days.        | 55. 5 months.           | 56. £50, 10s.         | 57. 13 <i>½</i> inches.     |
| 58. £1050.                   | 59. 18 horses.          | 60. 47 <i>⅓</i> days. | 61. 12 months.              |
| 62. £640.                    | 63. 242 <i>⅓</i> days.  | 64. 100,800 gallons.  | 65. 19 men.                 |
| 66. 13 <i>½</i> days.        | 67. 90 navvies.         | 68. 16 hrs.           | 69. 12 <i>⅓</i> days.       |
| 70. 4 days.                  | 71. 7 <i>⅓</i> weeks.   | 72. 37 <i>½</i> days. | 73. 144 days.               |
| 74. £28, 7s.                 | 75. 127 <i>⅓</i> days.  | 76. 240 men.          | 77. 4 <i>⅓</i> .            |
| 78. 240 <i>⅓</i> acres.      | 79. 9 <i>⅓</i> days.    | 80. 28 days.          |                             |

## SIMPLE INTEREST.

## Exercise 7.

- |                     |                    |                    |                  |
|---------------------|--------------------|--------------------|------------------|
| 1. £32.             | 2. £14, 8s.        | 3. £139, 10s.      | 4. £483, 12s.    |
| 5. £74, 8s.         | 6. £12, 15s.       | 7. £175.           | 8. £118, 5s.     |
| 9. £365, 12s. 6d.   | 10. £27, 5s. 7½d.  | 11. £69, 19s. 8d.  | 12. £50.         |
| 13. £27, 3s. 7½d.   | 14. £30, 6s.       | 15. £41, 17s. 6d.  | 16. £4, 9s. 3½d. |
| 17. £31, 10s. 6d.   | 18. £666, 4s. 3½d. | 19. £15, 16s. 6½d. |                  |
| 20. £8, 19s. 2½d.   | 21. £98, 8s.       | 22. £506, 5s.      | 23. £6, 18s.     |
| 24. £6, 15s.        | 25. £63, 10s. 2½d. | 26. £82, 14s. 9½d. |                  |
| 27. £598, 10s. 10d. | 28. £86, 8s. 7½d.  | 29. £119.          |                  |
| 30. £330, 2s. 10½d. |                    |                    |                  |

## Exercise 8.

- |                     |                      |                    |                   |
|---------------------|----------------------|--------------------|-------------------|
| 1. £80, 5s.         | 2. £110, 10s.        | 3. £14, 4s.        | 4. £253, 8s.      |
| 5. £99, 18s.        | 6. £314, 13s. 9d.    | 7. £1, 17s. 6d.    | 8. £128, 5s. 6½d. |
| 9. 14s. 9½d.        | 10. £7, 10s. 6½d.    | 11. £482, 5s. 2½d. |                   |
| 12. £266, 16s. 1½d. | 13. £1310, 15s. 4½d. | 14. £44, 13s. 8½d. |                   |
| 15. £26, 6s. 5½d.   | 16. £1309, 11s. 8d.  | 17. £7, 13s. 5½d.  |                   |
| 18. £351, 14s. 2½d. | 19. £3, 19s. 0½d.    | 20. £53, 2s. 6d.   |                   |

## Exercise 9.

- |                    |                    |                     |               |
|--------------------|--------------------|---------------------|---------------|
| 1. £4, 14s.        | 2. £2, 16s. 4d.    | 3. £3, 17s. 3d.     | 4. £7, 4s.    |
| 5. £6, 1s. 7½d.    | 6. 7s. 6d.         | 7. 8s. 11½d.        | 8. 13s. 10½d. |
| 9. £5, 6s. 2½d.    | 10. £17, 4s. 2½d.  | 11. £19, 10s. 7½d.  |               |
| 12. £8, 13s. 0½d.  | 13. £1, 18s. 10½d. | 14. £16, 1s. 1½d.   |               |
| 15. £18, 18s. 9½d. | 16. £5, 17s. 7½d.  | 17. £16, 17s. 11½d. |               |
| 18. £2, 1s. 4½d.   | 19. £17, 11s. 2½d. | 20. £9, 2s. 8½d.    |               |
| 21. £9, 19s. 0½d.  | 22. £2, 9s. 3½d.   | 23. £9, 7s. 1½d.    |               |
| 24. £2, 15s. 11½d. |                    |                     |               |

## Exercise 10.

- |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| 1. 15%.  | 2. 10½%. | 3. 6%.   | 4. 4½%.  | 5. 4%.   | 6. 4½%.  |
| 7. 2½%.  | 8. 4%.   | 9. 2½%.  | 10. 2½%. | 11. 50%. | 12. 7%.  |
| 13. 4½%. | 14. 3½%. | 15. 6½%. | 16. 3½%. | 17. 3½%. | 18. 2½%. |
| 19. 3½%. | 20. 2½%. |          |          |          |          |

## Exercise 11.

- |                         |                         |                                     |                  |                         |
|-------------------------|-------------------------|-------------------------------------|------------------|-------------------------|
| 1. $\frac{4}{3}$ yrs.   | 2. $22\frac{2}{3}$ yrs. | 3. $4\frac{1}{2}$ years.            | 4. 3 yrs. 5 mos. | 5. 1 yr.                |
| 6. 40 years.            | 7. $2\frac{1}{2}$ yrs.  | 8. 4 yrs.                           | 9. 25 years.     | 10. 3 yrs.              |
| 11. $1\frac{1}{2}$ yrs. | 12. 5 yrs.              | 13. $3\frac{3}{4}\frac{1}{12}$ yrs. | 14. 7 yrs.       | 15. $5\frac{1}{2}$ yrs. |
| 16. $2\frac{1}{2}$ yrs. | 17. $5\frac{1}{2}$ yrs. |                                     | 18. 5 yrs.       | 19. 6 yrs.              |

## Exercise 12.

1. £3500.      2. £3000.      3. £2730.      4. £250, 12s. 6d.  
 5. £1665.      6. £3375.      7. £1750.      8. £2637, 19s. 4d.      9. £940.  
 10. £825.      11. £200.      12. £4500.      13. £2270.      14. £3975.  
 15. £2560.      16. £2750.      17. £975.      18. £1845, 10s.      19. £900.  
 20. £150.      21. £750.      22. £800.      23. £340, 12s. 6d.      24. £150.  
 25. £1000.      26. £1729, 1s. 5*1*<sub>2</sub>d.      27. £160.      28. £200.  
 29. £318, 15s.      30. £250, 13s. 4d.

## Exercise 13.

1. £13, 10s. 6*1*<sub>2</sub>d.      2. £1067, 18s. 4*1*<sub>2</sub>d.      3. 4%.      4. 66*2*<sub>3</sub> years.  
 5. £859, 12s. 1*1*<sub>2</sub>d.      6. £140, 14s. 4d.      7. 80 years.      8. 6*2*<sub>3</sub>%.  
 9. £1750.      10. £403, 14s. 8*2*<sub>3</sub>d.      11. 80 years.      12. 4%.  
 13. £63, 9s.      14. £40, 16s. 8d.      15. 9%.      16. £265, 12s. 11*1*<sub>2</sub>d.  
 17. £16, 11s. 11*1*<sub>2</sub>d.      18. £275.      19. £53, 2s. 6d.      20. 10*1*<sub>2</sub>%.  
 21. £4328, 2s. 6d.      22. 3*1*<sub>2</sub> years.      23. 40 years.      24. 5%.  
 25. £800.      26. £91, 13s. 4d.      27. £1, 12s. 6d.      28. 3*2*<sub>3</sub>%.  
 29. £672, 10s.      30. £14,468, 10s.      31. 20th October.  
 32. 27th July.      33. 27th December.      34. 15th April, 1888.

## PRESENT WORTH AND DISCOUNT.

## Exercise 14.

1. £3500.      2. £3000.      3. £1003, 5s. 6d.      4. £35, 1s. 9d.  
 5. £800.      6. £160.      7. £11, 13s. 4d.      8. £377, 6s. 10*1*<sub>2</sub>d.  
 9. £2262.      10. £446, 19s. 6d.      11. £3450.      12. £1333, 6s. 8d.  
 13. £133, 6s. 8d.      14. £27, 13s. 6d.      15. £72, 11s. 3d.      16. £292.  
 17. £456, 5s.      18. £215, 6s. 2d.      19. £190, 11s. 6d.      20. £50.

## Exercise 15.

1. £2, 5s.      2. £7, 4s.      3. £10.      4. Banker's, £4, 10s.; true,  
 £4, 8s. 8*2*<sub>3</sub>d.; difference, 1s. 3*1*<sub>2</sub>d.      5. Ordinary, £11; true,  
 £10, 11s. 6*2*<sub>3</sub>d.; difference, 8s. 5*7*<sub>8</sub>d.      6. £10, 8s.      7. £312, 11s. 8d.  
 8. 15s. 6d.      9. £239, 0s. 10d.      10. £7, 19s. 4d.      11. £1490, 10s. 2d.  
 12. £5, 12s. 4d.      13. 3098, 11s. 2d.      14. £561, 19s. 1d.  
 15. £12, 6s. 8d.      16. £54, 7s. 3d.      17. £2149, 19s. 4d.  
 18. 19s. 2*1*<sub>2</sub>d.      19. £1, 2s. 6d.      20. £87, 2s. 3d.

## SQUARE ROOT.

## Exercise 16.

1. 68. 2. 76. 3. 39. 4. 47. 5. 56. 6. 78. 7. 26. 8. 36.  
 9. 95. 10. 64. 11. 53. 12. 45. 13. 362. 14. 560. 15. 248.  
 16. 356. 17. 345. 18. 201. 19. 444. 20. 303. 21. 405.  
 22. 370. 23. 225. 24. 320. 25. 1234. 26. 1030. 27. 3412.  
 28. 3403. 29. 16034. 30. 21302. 31. 34012. 32. 12345.  
 33. 4035. 34. 1326. 35. 4060. 36. 5012. 37. 25678.  
 38. 40123. 39. 33333. 40. 40306. 41. 6070. 42. 5103.  
 43. 3600. 44. 40444. 45. 16. 844. 46. 5555. 47. 36712.  
 48. 21035.

## Exercise 17.

1. 20·34. 2. 4·07. 3. 3·28. 4. 23·6. 5. 90·909. 6. 6·41.  
 7. 95·64. 8. 7·013. 9. 2·83. 10. 729·33. 11. 30·019. 12. 496·4.  
 13. 12·025. 14. 2·083. 15. 1·9203. 16. 3·009. 17. 0·6561.  
 18. 2·25. 19. 13·3. 20. 0·06031. 21. 5·043 + ..... 22. 2·49.  
 23. 7048. 24. 0·03. 25. 0·04. 26. 0·0505. 27. 3162 + .....  
 28. 1. 29. 0·03162 + ..... 30. 3285 + .....

## Exercise 18.

1. 4 $\frac{1}{2}$ . 2. 72 $\frac{1}{2}$ . 3. 17 $\frac{2}{3}$ . 4. 16 $\frac{1}{2}$ . 5. 63 $\frac{2}{3}$ . 6. 1 $\frac{1}{2}$  $\frac{1}{3}$ . 7. 15 $\frac{1}{2}$  $\frac{1}{3}$ .  
 8. 10 $\frac{1}{2}$  $\frac{1}{3}$ . 9. 76 $\frac{1}{2}$ . 10. 18 $\frac{1}{3}$ . 11. 23 $\frac{1}{2}$ . 12. 52 $\frac{2}{3}$ . 13. 8 $\frac{1}{2}$  $\frac{1}{3}$ .  
 14. 25 $\frac{1}{2}$  $\frac{1}{3}$ . 15. 36 $\frac{1}{2}$  $\frac{1}{3}$ . 16. 27 $\frac{1}{2}$ . 17. 19 $\frac{1}{2}$ . 18. 33 $\frac{1}{2}$ . 19. 28 $\frac{1}{2}$  $\frac{1}{3}$ .  
 20. 43 $\frac{1}{2}$  $\frac{1}{3}$ . 21. 10 $\frac{2}{3}$ . 22. 51 $\frac{1}{2}$  $\frac{1}{3}$ . 23. 56 $\frac{1}{2}$ . 24. 92 $\frac{1}{2}$  $\frac{1}{3}$ . 25. 69 $\frac{1}{2}$  $\frac{1}{3}$ .  
 26. 804 $\frac{1}{2}$  $\frac{1}{3}$ . 27. 156 $\frac{1}{2}$  $\frac{1}{3}$ . 28. 75 $\frac{1}{2}$  $\frac{1}{3}$ . 29. 47 $\frac{1}{2}$  $\frac{1}{3}$ . 30. 60 $\frac{1}{2}$  $\frac{1}{3}$ .

## EXAMINATION QUESTIONS FOR VI.

## SET I.

## Exercise 20.

- A.—1. 4 $\frac{1}{2}$ . 2. £3840. 3. 8 $\frac{1}{2}$ . 4. £37, 8s. 6d. 5. £15, 16s. 4 $\frac{1}{2}$ d.  
 6. 32 ac. 2 rds. 20 per.
- B.—1. 36 days. 2. £3, 19s. 7 $\frac{1}{2}$ d. 3. £175, 17s. 10 $\frac{1}{2}$ d. 4. 11·446.  
 5. 200. 6. 8020192.
- C.—1. 4 $\frac{1}{2}$ d. 2. £1, 2s. 5d. 3. 1100. 4. 17 cwt. 3 qrs. 24 $\frac{1}{2}$  lbs.  
 5. 84. 6. £109, 10s.

- D.—1.  $\frac{1}{8}$ . 2. 40 years. 3. 71428. 4.  $11\frac{1}{4}$  days. 5. £4.  
6.  $\frac{2}{3}\frac{3}{5}$ .
- E.—1.  $\frac{2}{3}\frac{2}{7}$ . 2. £57, 17s. 11 $\frac{1}{2}$ d. 3. 10 years. 4.  $\frac{5}{6}$ .  
5. £47, 6s. 3 $\frac{3}{4}$ d. 6. £1, 0s. 8 $\frac{1}{2}$ d.
- F.—1. £1458, 6s. 8d. 2. £3, 13s. 3 $\frac{3}{7}$ d. 3. £42, 14s. 6 $\frac{5}{14}$ d.  
4. 3 $\frac{1}{2}$ . 5.  $\frac{1}{4}\frac{1}{4}$ . 6.  $1\frac{1}{4}\frac{3}{8}$ .
- G.—1. £256 and £288. 2. 1273. 3. £3, 17s. 1d. 4.  $11\frac{1}{2}$  days.  
5. £1034, 1s. 8d. 6. 17 cwts. 3 qrs. 8 lbs.
- H.—1. 48 cwts. 2 qrs. 18 lbs. 2. £11, 4s. 9 $\frac{1}{2}$ d. 3. .00358.  
4. 866 $\frac{2}{3}$  miles. 5. £1486, 14s. 8d. 6. .0065625.
- I.—1. 1355 ac. 3 rds. 8 per. 8 yds. 2. £556, 7s. 9d. 3. 5%.  
4. .0369147. 5. .0002486. 6.  $\frac{1}{2}\frac{1}{2}$ .
- J.—1.  $2\frac{2}{3}$ . 2. £1, 18s. 0 $\frac{1}{2}\frac{1}{2}$ d. 3. £3, 12s. 10 $\frac{3}{4}$ d. 4. 1 $\frac{1}{2}$ .  
5. £99, 18s. 11 $\frac{1}{2}$ d. 6. .421.
- K.—1. £1, 0s. 7d. 2. 22916. 3. 350. 4. Written. 5. 12s. 6d.  
6. 34·4166825.
- L.—1. £4, 14s. 8 $\frac{1}{2}$ d. 2. £225. 3. 6·016. 4. £12,000.  
5. 192·6976. 6. Written.
- M.—1.  $1\frac{1}{3}\frac{1}{2}$ . 2. 1·4625. 3. £1, 9s. 4d. 4. 1s. 9 $\frac{1}{2}$ 9d.  
5. 1·1944542. 6. 7 $\frac{1}{2}$ .
- N.—1. 5 $\frac{1}{2}$ . 2. £8, 0s. 2d. 3. 18 men. 4. 1000.  
5. 1·8165. 6. £5, 13s. 2d.
- O.—1. £7, 9s. 11d. 2. 5s. 6 $\frac{1}{2}$ d. 3. .26457. 4. 16.  
5. £488, 6s. 9d. 6. 110.
- P.—1. £3, 3s. 2. 15s. 7 $\frac{1}{2}$ d. 3. 4 $\frac{1}{4}\frac{3}{4}$ . 4. 18s. 6 $\frac{1}{2}$ d. 5. 1·16424.  
6. 90 days.
- Q.—1. 12·6241. 2. £128, 0s. 7·12d. 3. £5, 0s. 5·28d.  
4. .05477. 5. £20, 18s. 11·5d. 6. .196875.
- R.—1. 16 $\frac{1}{2}$ . 2. £82, 6s. 8d. 3. 15s. 4. 17 lbs. 9 ozs. 11·23 drs.  
5. £20, 6s. 1d. 6. 7s.
- S.—1. 9 $\frac{1}{2}$ . 2. £22, 10s. 2d. 3. .9. 4. £1, 2s. 6d.  
5. 12s. 6 $\frac{1}{2}\frac{1}{2}$ d. 6. 38·24 min.
- T.—1. £110, 10s. 2. £1, 4s. 3. .000897..... 4. 11 mls.  
296 yds. 5.  $\frac{1}{2}$ . 6. £124, 7s. 7 $\frac{1}{2}$ d.
- U.—1. 3218·90625. 2. £3363, 5s. 7 $\frac{1}{2}$ d. 3. 3 $\frac{1}{2}\frac{1}{4}$ . 4. 2 miles.  
5. 11s. 0 $\frac{1}{2}$ d. 6. £240.
- V.—1. 16 $\frac{1}{2}$ . 2. 550 yards. 3. 14,400 miles. 4.  $\frac{1}{6}$  mile.  
5.  $1\frac{1}{2}\frac{1}{2}\frac{1}{2}$ . 6. 299·99676.
- W.—1. .0027. 2. £767. 3. £3, 17s. 9d. 4. £3, 6s. 6d.  
5. 7 $\frac{1}{2}$  months. 6. 36,900.

- X.—1. 31·5245. 2. £491, 13s. 4d. 3.  $1\frac{8}{11}$  days. 4. Written.  
 5. £2000; £600; £400. 6. £400.  
 Y.—1. £1750. 2. 3%. 3. 12 days. 4. £1, 18s. 1d.  
 5. £912, 10s. 6.  $48\frac{1}{2}$  miles.  
 Z.—1. 3s. 2. £13, 11s. 2d. 3. Written. 4. 16. 5. £99.  
 6. £25.
- 

## SET II.

- A 2.—1. 0029808; 43·478..... 2.  $6\frac{1}{2}\%$ . 3. 116 $\frac{1}{2}$ .  
 4. 11s. 6d. 5. 6 men. 6. £520; £240; £100.  
 B 2.—1.  $107\frac{1}{2}$ . 2. 1422·2. 3. £873. 4. G.C.M. = 121;  
 L.C.M. = 13728. 5. 1·024. 6. £1, 9s. 9d.  
 C 2.—1. 6 $\frac{1}{2}$ . 2. 9·5. 3.  $\frac{3}{4}$ d. 4.  $\frac{2}{3}\frac{1}{2}$ . 5. £1, 13s. 5 $\frac{1}{2}$ d.  
 6. £11,342, 13s. 5 $\frac{3}{4}$ d.  
 D 2.—1. -8 $\frac{1}{2}$ ; 17·09; 3·8571428. 2. .075. 3. £100. 4. 3s. 6d.  
 5. £194, 17s. 6d. 6. A, £250; B, £450; C, £300.  
 E 2.—1. 34 $\frac{1}{2}$ . 2. £9, 13s. 8 $\frac{1}{4}$ d. 3. 1. 4. £4, 16s. 8d.  
 5. £68, 9s. 3 $\frac{1}{2}$ d. 6. £4, 11s. 3d.  
 F 2.—1. 326·4. 2. 3s. 4d. 3. .035. 4. 10%. 5. £48, 17s. 8 $\frac{1}{2}$ d.  
 6. 28 horses.  
 G 2.—1. 8. 2. £13, 0s. 7 $\frac{1}{2}$ d. 3. £420. 4. 50,000.  
 5. £12, 18s. 9d. 6. £800.  
 H 2.—1. £4. 2. 23·16. 3. 29 $\frac{1}{4}$ . 4. £1050. 5. £1, 5s.  
 6. 4·2083.  
 I 2.—1. £515, 10s. 5 $\frac{1}{2}$ d. 2. £30. 3. 4·90. 4. £4, 5s.  
 5. £2560. 6. £295, 16s. 8d.  
 J 2.—1. 18s. 2 $\frac{1}{4}$ d. 2. 25%. 3.  $21\frac{1}{2}$ ; 18. 4. 1 cwt. 0 qr. 3 lbs.  
 5. 96 rods. 6. 41·2184.  
 K 2.—1. £61, 12s. 2. £750. 3. 360 men. 4.  $\frac{5445}{11355}$ .  
 5. 7 cwts. 3 qrs. 6. 1·42857.  
 L 2.—1. 13·13493. 2. 78; 91; 117; 143. 3. £29, 3s. 4d.  
 4. £183, 6s. 8d. 5.  $\frac{1}{8}\frac{1}{3}$ . 6. 40; 48.  
 M 2.—1. £4, 6s. 6d. 2. £273, 0s. 9d. 3. 30 miles. 4.  $\frac{11}{11}$ .  
 5. £3546, 4s. 8 $\frac{1}{4}$ d. 6. £23, 2s. 4 $\frac{1}{2}$ d.  
 N 2.—1.  $3\frac{1}{11}$  years. 2.  $3\frac{1}{2}$ . 3. £95, 19s. 5 $\frac{1}{2}$ d.; £115, 3s. 4d.;  
 £134, 7s. 2 $\frac{1}{2}$ d. 4. 7 hrs. 18 min. 21 sec. 5. 3 rds. 24 per.;  
 1 ac. 2 rds. 30 per. 6. 4s. 11 $\frac{1}{4}$ d.  
 O 2.—1. £1. 2. 3720 far.; 1 qr. 1 lb. 1 oz. 3. £7, 3s. 9d.  
 4. 27. 5. 175 l

- P2.—1. 8 men. 2.  $\frac{1}{4}$ . 3. £10, 17s. 9d. 4. £1244, 10s. 1 $\frac{1}{2}$ d.  
 5. 22. 6. 7s. 8d.
- Q2.—1. £640. 2. 4 years. 3. £84, 4s. 2 $\frac{1}{2}$ d. 4. £231, 8s.  
 5. £94, 10s. 6. 5334620.
- R2.—1. £3715, 19s. 8 $\frac{1}{2}$ d. 2. £1674, 4s. 3. 20 weeks.  
 4. £2, 3s. 4d. 5. £132, 1s. 8d. 6. 3 $\frac{1}{2}$ .
- S2.—1. £1, 4s. 11 $\frac{1}{2}$ d.; £107, 18s. 3 $\frac{1}{2}$ d. 2. 162 francs.  
 3. 3714285%. 4. 12s. 3d. 5. 1s. 6d. 6. 23 $\frac{1}{2}$  days.
- T2.—1. £650, 6s. 2. 2 days. 3. 4 $\frac{2}{3}$ %. 4. 28 $\frac{1}{2}$  years. 5. 7185.  
 6. £560.
- 

## PROPORTIONAL PARTS.

## Exercise 22.

1. 78, 91, 117, 143. 2. £4023 11s. 4d.; £3520, 12s. 5d.; £2011, 15s. 8d.; £1005, 17s. 10d. 3. A, £50; B, £33, 15s.
4. A, £278, 2s. 6d.; B, £323, 19s. 2d.; C, £397, 18s. 4d. 5. 504, 420, 360, 315, 280. 6. £639, 7s. 2 $\frac{1}{2}$ d.; £695, 10s. 4 $\frac{1}{2}$ d.; £576; £249, 2s. 4 $\frac{1}{2}$ d. 7. £193, 12s.; £580, 16s.; £968; £1355, 4s.; £1742, 8s. 8. £322, 18s. 4d.; £645, 6s. 8d.; £968; £1290, 18s. 4d. £1613, 6s. 8d. 9. £576; £324; £384; £1944; £432.
10. £413, 10s. 11 $\frac{1}{2}$ d.; £331, 1s. 4 $\frac{1}{2}$ d.; £255, 6s. 9 $\frac{1}{2}$ d. 11. £556, 5s.; £647, 18s. 4d.; £795, 16s. 8d. 12. £840; £1890; £1890; £1800; £1120. 13. £741, 12s.; £667, 4s.; £576; £175, 4s.
14. £130; £52; £78; £242, 13s. 4d.; £537, 6s. 8d. 15. A's = £838; B's = £167, 12s. 16. G. = £806, 18s. 4d.; T. = £645, 6s. 8d.; H. = £322, 18s. 4d.; Joe = £161, 6s. 8d.; M. = £484. 17. £432; £211, 13s. 7 $\frac{1}{2}$ d.; £33, 2s. 4 $\frac{1}{2}$ d.; £43, 4s. 18. 390; 156; 234; 728; 1612. 19. A, £220; B, £110; C, £330. 20. £35; £3; 10s.
21. £392, 14s. 6 $\frac{1}{2}$ d.; £753, 18s. 9 $\frac{1}{2}$ d.; £853, 6s. 8d. 22. £218, 6s. 8d.; £220; £66, 18s. 4d. 23. A, £45; B, £49, 10s.; C, £50.
24. £2, 19s. 7d.; £11, 18s. 4d.; £10, 14s. 6d. 25. £5, 17s. 6 $\frac{1}{2}$ d.; £11, 15s. 0 $\frac{1}{2}$ d.; £17, 12s. 6 $\frac{1}{2}$ d. 26. £900; £1120; £750.
27. £28, 10s. 28. A, 48; B, 24; C, 16; D, 12. 29. A, £10,000; B, £7500; C, £6250. 30. 3 cwt. 31. A, £62, 10s.; B, £62, 10s.; C, £125; D, £250. 32. 3 ozs. 7 dwts. 6 $\frac{1}{2}$  grs.
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## PROFIT AND LOSS.

## Exercise 23.

1. 16s. 8d.    2. £15 loss.    3. £7, 3s. 9d. gain.    4. £14 gain.  
 5. 6d. per stone.    6. 18s. per gallon.    7. 320 yards.    8. 7½ tons.  
 9. £3, 18s.    10. 1600 lbs.

## Exercise 24.

1. 20% gain.    2. 11½%.    3. 20%.    4. 16⅔%.    5. 20%.    6. 22⅓%.  
 7. 20%.    8. 20%.    9. 14%.    10. 16⅓%.    11. 8% loss.    12. 7⅓%.  
 13. 25%.    14. 29⅓%.    15. 28%.    16. 5%.    17. 3⅓%.    18. 12% gain.  
 19. 37½%.    20. 31⅓%.

## Exercise 25.

1. 5s. 6d.    2. £10, 8s.    3. 4⅔d.    4. £27, 10s.    5. £21.  
 6. £7, 4s.    7. 5s. 6d.    8. 6s. 3d.    9. £7, 4s.    10. 2½d.

## Exercise 26.

1. £4.    2. 3s. 4d.    3. £420.    4. £37, 10s.    5. £100.  
 6. £2, 13s. 4d.    7. £20, 10s.    8. £60.    9. £60.    10. £4, 10s. 10⅓d.

## Exercise 27.

1. £378.    2. 4s. 11⅔d.    3. £100.    4. 10s.    5. £288, 1s. 6d.  
 6. £30, 15s.    7. £1.    8. £82, 7s. 0⅓d.    9. £304, 6s. 11⅔d.  
 10. 6s. 5⅓d.    11. 10s. 2⅓d.    12. 60%.    13. 40% gain.    14. 8s. 5⅓d.  
 15. £2, 3s. 9d.    16. £22, 18s. 2⅓d.    17. £1, 12s.    18. 3s. 1⅓d.  
 19. 5s. 3d.    20. 33⅓% gain.    21. 2s.    22. 50% gain.    23. 16% loss.  
 24. 26⅔.    25. 20%.    26. £1.    27. £81, 15s.    28. 60%.    29. 1s. 8d.  
 30. £19, 16s.    31. 16⅓%.    32. £3, 2s. 6d.    33. 33⅓%.    34. 33⅓%.  
 35. 11½% gain.    36. £13, 16s.    37. £54.    38. £23, 6s. 8d.    39. 7d.  
 40. 50%.    41. 5%.    42. 55%.    43. 11d.    44. 19% loss.    45. £33.  
 46. £30.    47. 16⅓% loss.    48. 17s.    49. 3s. 7d.    50. 12% gain.  
 51. 20 eggs.    52. 11½%.    53. 5 needles.    54. 6d.    55. 50% gain.  
 56. 14s. 8⅔d.    57. 17s. 6d.    58. 68⅓%.    59. 31s.    60. 3s. 3⅓d.

## COMPOUND INTEREST.

## Exercise 28.

| AMOUNT. |          |    | INTEREST.       |      |      |                   |          |
|---------|----------|----|-----------------|------|------|-------------------|----------|
| £       | s.       | d. | £               | s.   | d.   |                   |          |
| 1.      | 3,864    | 16 | 11·2608         | 619  | 16   | 11·2608.          |          |
| 2.      | 5,228    | 11 | 2·4576          | 838  | 11   | 2·4576.           |          |
| 3.      | 753      | 13 | 2·1312          | 83   | 13   | 2·1312.           |          |
| 4.      | 6,955    | 15 | 10·596          | 1277 | 15   | 10·596.           |          |
| 5.      | 10,439   | 5  | 1·257           | 1674 | 5    | 1·257.            |          |
| 6.      | 8,581    | 5  | 4·867           | 1376 | 5    | 4·867.            |          |
| 7.      | 1,563    | 11 | 2·6304          | 173  | 11   | 2·6304.           |          |
| 8.      | 4,939    | 2  | 6·249           | 419  | 2    | 6·249.            |          |
| 9.      | 4,371    | 0  | 6·892           | 701  | 0    | 6·892.            |          |
| 10.     | 4,466    | 6  | 2·4             | 716  | 6    | 2·4.              |          |
| 11.     | 3,678    | 6  | 1·2672          | 408  | 6    | 1·267.            |          |
| 12.     | 6,235    | 11 | 5·856           | 1285 | 11   | 5·856.            |          |
| 13.     | 4,919    | 18 | 1·488           | 669  | 18   | 1·488.            |          |
| 14.     | 3,993    | 16 | 1·5             | 543  | 16   | 1·5.              |          |
| 15.     | 2,431    | 0  | 3               | 331  | 0    | 3.                |          |
| 16.     | 5,498    | 14 | 4 $\frac{1}{2}$ | 748  | 14   | 4 $\frac{1}{2}$ . |          |
| 17.     | 306      | 15 | 4·95            | 41   | 15   | 4·95.             |          |
| 18.     | 1,736    | 8  | 9               | 236  | 8    | 9.                |          |
| £       | s.       | d. | £               | s.   | d.   |                   |          |
| 19.     | 362      | 7  | 0·3264.         | 20.  | 3229 | 10                | 0·0321.  |
| 21.     | 459      | 9  | 11·884.         | 22.  | 264  | 13                | 8·757.   |
| 23.     | 3392     | 4  | 1·3125.         | 24.  | 590  | 16                | 8·4.     |
| 25.     | 798      | 16 | 8·909.          | 26.  | 4496 | 0                 | 4·40625. |
| 27.     | Int. 326 | 3  | 8; Amount, 3326 | 3    | 8.   |                   |          |
| 28.     | 1228     | 2  | 10·869.         | 29.  | 3651 | 14                | 7·584.   |
| 30.     | 2689     | 4  | 3·5235.         |      |      |                   |          |

## Exercise 29.

1. £43, 9s. 8·88d.      2. £164, 17s. 3·4d.      3. £555, 13s. 2 $\frac{1}{2}$ d.  
 4. £2, 14s. 10 $\frac{1}{2}$ d.      5. B gets 3s. 5·9328d. more than A.  
 6. £63, 9s. 11·34d.; and £753, 9s. 11·34d.      7. £126, 13s. 11·29d.  
 8. 18s. 5·9805d.      9. £7246, 8s. 1·1697d.      10. £5238, 18s. 10·07025d.  
 11. £9497, 18s. 6·15825d.      12. £2976, 18s. 1·79865d.  
 13. £5266, 8s. 2·3775d.      14. £23,316, 6s. 8·8587d.  
 15. £42, 7s. 10·745d.      16. £453, 17s. 11·3107d.  
 17. £3930, 18s. 0·1875d.      18. £364, 1s. 6 $\frac{1}{2}$ d.  
 19. £4054, 12s. 3·708d.      20. £443, 1s. 10·45d.      21. £85

22. £7007, 18s. 0½d.    23. £2050, 10s. 8d.    24. £4921, 7s. 9½d.  
 25. £6282, 7s. 0½d.    26. £457, 16s. 11½d.    27. S.L. £1, 4s. 11½d;  
 C.I. £1, 5s. 11d.    28. £4802, 15s. 3½d.    29. £3, 5s. 10½d.  
 30. (a) £391, 13s. 7½d.; (b) £5191, 13s. 7½d.    31. £41, 15s. 4½d.  
 32. £107, 15s. ½d.    33. £16, 8s. 10½d.    34. D.M. £4, 8s. 10½d.  
 35. Diff. 18s. 5½d.    36. £375.    37. £4250.    38. £2000.  
 39. £1000.    40. £1500.
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## STOCKS.

### Exercise 30.

1. £1004 stock.    2. £4065 stock.    3. £3048 stock.  
 4. £3640 stock.    5. £3045 stock.    6. £1275 stock.  
 7. £6332, 10s. stock.    8. £6332, 10s. stock.    9. £6332, 10s. stock.  
 10. £6332, 10s. stock.

### Exercise 31.

1. (a) £903, 12s.; (b) £953, 16s.; (c) £1054, 4s.; (d) £1204, 16s.  
 2. (a) £3789, 16s.; (b) £4715, 8s.; (c) £4390, 4s.; (d) £4207, 5s. 6d.  
 3. (a) £2926, 1s. 7½d.; (b) £3657, 12s.; (c) £3048.    4. (a) £3458;  
 (b) £4004; (c) £3640.    5. (a) £3532, 4s.; (b) £2862, 6s.  
 6. A, £1224; B, £1211, 5s.; C, £1249, 10s.; D, £1185, 15s.;  
 E, £1388, 15s.; F, £1581; G, £1083, 15s.; H, £918.  
 7. £3104, 17s. 7½d.    8. £1992, 19s. 2½d.    9. £5414, 5s. 9d.  
 10. £5857, 11s. 3d.    11. £6095, 0s. 7½d.    12. £6601, 12s. 7½d.  
 13. £7796, 17s. 9½d.    14. £6253, 6s. 10½d.    15. A, £9021, 2s.;  
 B, £8112, 10s.; C, £6922, 13s. 4d.    16. X, £953, 11s. 3d.;  
 Y, £875, 8s. 9d.; Z, £1018, 17s. 6d.; W, £1136, 8s. 9d.  
 17. £124, 18s. 4d.    18. £644, 2s.    19. £975, 10s.  
 20. £3125, 4s. 2½d.

### Exercise 32.

1. £208, 6s. 8d.    2. £183, 7s. 2½d.    3. £14, 16s. 3½d.  
 4. £85, 18s. 2½d.    5. £85, 14s. 3½d.    6. £83, 4s.    7. £170, 13s. 4d.  
 8. £237, 10s.    9. £360.    10. £78.    11. £44, 8s. 10½d.  
 12. £241, 10s.    13. £67.    14. £333, 12s.    15. £158, 5s.  
 16. £197, 14s. 9d.    17. £135.    18. £361, 5s.    19. £281, 5s.  
 20. £71, 8s. 3d.    21. £326, 19s.    22. £285.    23. £200.  
 24. £1.

## Exercise 33.

1. £3750. 2. £1872. 3. £3600. 4. £5700. 5. £9000.  
 6. (a)  $3\frac{3}{11}\%$ ; (b)  $3\frac{3}{7}\%$ ; (c)  $3\frac{3}{11}\%$ ; (d) 3%. 7. (a)  $4\frac{4}{11}\%$ ; (b)  $4\frac{4}{11}\%$ ; (c)  $6\frac{1}{3}\%$ . 8. (a)  $5\frac{5}{9}\%$ ; (b)  $4\frac{4}{9}\%$ ; (c)  $4\frac{4}{9}\%$ . 9. (a)  $4\frac{4}{5}\%$ ; (b)  $5\frac{5}{9}\%$ ; (c)  $4\frac{4}{9}\%$ . 10. (a) 8%; (b)  $7\frac{1}{4}\%$ ; (c)  $11\frac{1}{3}\%$ .  
 11. (a)  $2\frac{1}{11}\%$ ; (b)  $2\frac{1}{6}\%$ ; (c)  $4\frac{4}{9}\%$ . 12. (a)  $2\frac{1}{12}\%$ ; (b)  $4\frac{4}{9}\%$ .  
 13. 5% at 127. 14.  $4\frac{1}{2}\%$  at 125. 15. £5. 16. 3% at 92.  
 17. 4% at par. 18.  $4\frac{1}{2}$  at  $112\frac{1}{2}$ . 19. (a) £83 $\frac{1}{2}$ ; (b) £166 $\frac{2}{3}$ ; (c) £200.  
 20. (a) £75; (b) £112 $\frac{1}{2}$ ; (c) £56 $\frac{1}{4}$ . 21. Par. 22. (a) £50;  
 (b) £66 $\frac{2}{3}$ ; (c) £40. 23. (a) £177 $\frac{7}{8}$ ; (b) £200; (c) £80.  
 24. (a) £233 $\frac{1}{2}$ ; (b) £200; (c) £140. 25.  $9\frac{1}{11}\%$ . 26. 4%.  
 27.  $7\frac{1}{11}\%$ . 28.  $13\frac{1}{5}\%$ . 29.  $3\frac{1}{5}\%$ . 30. (a) £125; (b) £75.  
 31. (a) £60; (b) £66 $\frac{2}{3}$ ; (c) £150. 32. £142 $\frac{7}{8}$ . 33. £220.  
 34.  $3\frac{3}{4}\%$  at par. 35. £13,000. 36. £1196, 5s. 37. £826, 17s. 6d.  
 38. £1718, 13s. 2d. 39. 93. 40. 5%.

## Exercise 34.

1. £15, 10s. increase. 2. No change in income. 3. £22, 10s.  
 4. £15, 3s.  $0\frac{1}{11}d$ . increase. 5. £58, 15s. 6. £53, 13s.  $1\frac{1}{11}d$ . 7. He  
 diminishes it by 10·89d. 8. £1, 8s. 6 $\frac{1}{2}$ d. 9. £29, 5s. 11d.  
 10. £465. 11. £2400. 12. £3168, 12s. 4d. 13. £17, 10s. gain.  
 14. £71, 10s. gain. 15. £61 gain. 16. £3119, 13s. 4d. 17. 93.  
 18. £22, 2s. 6d. 19. £1, 13s. 4d. 20. £26, 13s. 4d. gain.

## Exercise 35.

1.  $4\frac{1}{2}$  per cents; £10. 2.  $2\frac{1}{11}\%$ . 3. 3 per cents by £41, 10s.  $2\frac{1}{11}d$ .  
 4. £1278, 6s. 8d. 5. £2700. 6.  $112\frac{1}{2}$ . 7. 98. 8. £2900. 9.  $133\frac{1}{2}$ .  
 10. 3%. 11. £128, 17s.  $9\frac{1}{2}d$ . 12. £138. 13. £19 increase. 14. £60.  
 15. £91. 16. £4788. 17. 5%. 18. £6483, 15s. 19. £3427.  
 20. £127, 10s. 21. Canadian 5 per cents. 22. £30. 23. £90.  
 24. £7816, 5s. 25. £800 stock. 26.  $3\frac{2}{7}\%$ . 27. £114 $\frac{2}{3}$ .  
 28. £189; £5985. 29. £6, 5s. 30. £1575. 31. £44, 5s.  
 32. £6240. 33.  $91\frac{1}{2}$ . 34. £24 decrease. 35. £1078, 16s.  
 36. £3600 stock; £126 income. 37. £1000 stock. 38. £1950.  
 39.  $106\frac{2}{3}$ . 40. 70%.

## Exercise 36.

1. (a) £5120; (b) £5333, 6s. 8d.; (c) £4266, 18s. 4d. 2. (a) £8042;  
 (b) £5361, 6s. 8d.; (c) £5552, 16s. 2½d. 3. (a) £12,453, 18s. 6½d.;  
 (b) £9335, 1s. 4½d. 4. (a) £3605, 0s. 1½d.; (b) £3115, 8s. 9d.;  
 (c) £2670, 7s. 6d. 5. (a)  $2\frac{1}{4}\frac{1}{2}\frac{1}{2}$ ; (b)  $2\frac{5}{6}$ ; (c)  $4\frac{4}{5}$ . 6. (a)  $2\frac{1}{2}\frac{1}{2}$ ; (b)  $4\frac{11}{14}$ .  
 7. (a) £1777  $\frac{7}{8}$ ; (b) £199  $\frac{7}{8}$ ; (c) £79  $\frac{7}{8}$ . 8. (a) £233  $\frac{6}{7}$ ; (b) £199  $\frac{7}{8}$ ;  
 (c) £139  $\frac{1}{4}$ . 9. 90  $\frac{1}{2}\frac{1}{2}$ . 10. £3660. 11. 3½%. 12. £244, 6s. 8d.
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## CUBE ROOT.

## Exercise 37.

1. 69. 2. 28. 3. 73. 4. 39. 5. 95. 6. 59. 7. 79. 8. 98.  
 9. 87. 10. 43. 11. 85. 12. 99. 13. 78. 14. 76. 15. 67.  
 16. 81. 17. 96. 18. 47. 19. 62. 20. 68. 21. 52. 22. 88.  
 23. 58. 24. 92. 25. 36. 26. 736. 27. 727. 28. 802. 29. 915.  
 30. 616. 31. 796. 32. 820. 33. 979. 34. 857. 35. 16.  
 36. 46. 37. 601. 38. 805. 39. 811. 40. 673. 41. 2727.  
 42. 71·26. 43. 82·34. 44. 2·1. 45. 5·7. 46. 5·03. 47. 9·04.  
 48. 6·22. 49. 49·6. 50. 34·16. 51. 84·03. 52. 91·06. 53. 33.  
 54. 3·9. 55. 7·02. 56. 7·09. 57. 5·66. 58. 72·2. 59. 62·34.  
 60. 65·19. 61. 27·34. 62. 171·26. 63. 207·84. 64. 102·001.  
 65. 301·003. 66. 100·001. 67. 100·202. 68. 168·31. 69. 209·71.  
 70. 201·002. 71. 600·006. 72. 200·002. 73. 111·111. 74. 174·27.  
 75. 260·68. 76. 160·001. 77. 500·005. 78. 200·101. 79. 121·012.  
 80. 611·23. 81. 5½. 82. 2½. 83. 6½. 84. 4½. 85. 4½. 86. 3½.  
 87. 5½. 88. 1½. 89. 3½. 90. 3½. 91. 7½. 92. 4½. 93. 8½.  
 94. 8½. 95. 8½. 96. 24½. 97. 30½. 98. 31½. 99. 6½.  
 100. 234.
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## ALLIGATION.

## Exercise 38.

1. 6d. 2. 15s. 6d. 3. 18s. 8½d. 4. 2s. 10½d. 5. 5 of 1s. 5d.  
 with 3 of 2s. 9d. 6. 3 at 39s. to 8 at 50s. 7. 8 at 4d.; 7 at 6d.  
 7 at 7½d. 8. 3, 1, 1, 5, or 1, 3, 5, 1 respectively. 9. 3 : 3 : 5  
 10. 1 at £80 to 1 at £100. 11. 120 lbs. 12. 6 : 5 : 1 : 3  
 13. 15½ carats fine. 14. 7 : 5. 15. 33 gallons of each  
 16. 10 : 10 : 50 or 90 : 150 : 30.

## CHAIN RULE.

## Exercise 39.

1. £47, 5s.    2. 16s.    3. 15s. 9d.    4. 5d. per lb.    5. £49, 10s.  
 6. £37, 10s.    7. 9s. 4d.    8. £18.    9. 14 guineas.    10. £2, 9s.  
 11. £7, 4s.    12. £2, 10s.
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## ARITHMETICAL PROGRESSION.

## Exercise 40.

1. 25.    2. 63.    3. 72.    4. - 10.    5. 30.    6. 1080.  
 7. 210.    8. 258.    9. - 35.    10. 200.    11. 34750.  
 12. - 5½.    13. 14, 16, 18.    14. 14½, 14¾, ....    15. 6½, 5, ....  
 16. - ½, ½, ....    17. 4.    18. 78.    19. - 5.    20. 10, 100 yards.
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## GEOMETRICAL PROGRESSION.

## Exercise 41.

1. 1365.    2. 254.    3. 605.    4. 2048.    5. 2187.    6. 147.  
 7. 4½.    8. 4, 16, 64.    9. 8, 12, 18, 27.    10. £4,473,924, 5s. 3½d.
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EXAMINATION EXERCISES FOR VI<sup>2</sup>.VI<sup>2</sup>. SET I.

- A1.—** 1. 165,920 lbs.    2. £101, 5s.    3. (a) 11½; (b) ¼;  
 (c) 34½.    4. £3800.    5. 7s. 11·35d.    6. 2·0766.
- B1.—** 1. 142.    2. 28½ days.    3. 47% gain.    4. 26½ ozs.  
 5. £12,600.    6. £89, 12s. 7·87d.
- C1.—** 1. 29394.    2. £2, 0s. 8·268d.    3. £44, 13s. 4½ d.  
 4. £812, 10s.    5. £52, 10s.    6. 9·472.

- D1.—1. £39 3s8d.      2. £15, 10s. 4½d.      3. 9½ days.  
 4. £114s. 2s. 11½d.      5. 16.      6. £100.
- E1.—1. £8600.      2. 109 3493.      3. 175.  
 4. 247619d.      6. 1 1/2 days.
- F1.—1. 16s. 2s. 6d.      2. 64125.      3. £14,600.      4. 24 men.  
 5. 10s.      6. £504; £168; £168.
- G1.—1. £1824, 6s. 19½d.      2. £305.      3. £114, 1s. 7½d.  
 4. £40; £36.      5. £6000.      6. .07.
- H1.—1. £1571, 4s. 3½d.      2. 1260.      3. 175.  
 5. 8½ hours.      6. 12s. 1 1/2d.
- I1.—1. 15½ gallons.      2. 874.      3. 9s. 8d.      4. 108 1/4.  
 5. 146 days.      6. £337, 10s.
- J1.—1. The latter.      2. £300; £262, 10s.; £287, 10s.  
 3. £260, 12s. 6d.      4. £243, 2s. 0½d.      5. £2, 18s. 6d.      6. 31 1/2.
- K1.—1. 4½ days.      2. 50 lbs.      3. 16.      4. 23349.  
 5. 6½ cwts.      6. £30.
- L1.—1. 3 984l.      2. 55½ days.      3. £608, 6s. 8d.      4. £1000.  
 5. A, £26, 1s. 8½d.; B, £23, 18s. 3½d.      6. 9s. 2d.
- M1.—1. 100 men.      2. £7218, 15s.      3. 14461.      4. £480.  
 5. 10 times.      6. 30086.
- N1.—1. £27, 3s. 9½d.      2. 21 1/4% gain.      3. 5%.  
 4. 8½ days.      5. £53, 14s. 9½d.      6. 939.
- O1.—1. 5½ days.      2. 5.      3. A, £238 14/15; B, £289 11/15;  
 C, £472 11/15.      4. 208.      5. £40 gain.      6. £33, 6s. 8d.
- P1.—1. 1 1/2 work.      2. £120, 15s.      3. 50 ac. 0 rd. 10 per.  
 4. 4 1/4.      5. 3 065.      6. 11.
- Q1.—1. 75% gain.      2. £4500.      3. 49776 lbs.      4. .04409.  
 5. £1716, 10s. 7½d.      6. 0693.
- R1.—1. 63 gallons.      2. 89½.      3. 9354.      4. 146 days.  
 5. 4641.      6. £486, 4s. 0½d.

VI<sup>2</sup>. SET II.

- A2.—1. 1s. 4d.      2. 24 men.      3. 3s. 8d.      4. £255.      5. £4, 14s. 4d.  
 6. 8%.
- B2.—1. £540.      2. 18 days.      3. £1800.      4. 40 days.  
 5. 6½% gain.      6. £120, £1

- |        |                   |    |                 |    |                               |         |                      |    |       |
|--------|-------------------|----|-----------------|----|-------------------------------|---------|----------------------|----|-------|
| C2.—1. | 110 boys.         | 2. | 14.             | 3. | 31½%.                         | 4.      | £130.                | 5. | 13½.  |
| D2.—1. | 4½ ozs.           | 2. | 67½.            | 3. | 176 days.                     | 4.      | £1520.               | 5. | 5·97. |
| E2.—1. | £155, 1s. 3d.     |    |                 |    |                               |         |                      |    |       |
| E2.—1. | 31½% at 99.       | 2. | 3600.           | 3. | 6½ cwts.                      | 4.      | £27, 19s.; £36, 11s. |    |       |
| E2.—1. | 60 men.           | 6. | 476190.         |    |                               |         |                      |    |       |
| F2.—1. | 24%.              | 2. | 16s. 8d.        | 3. | 24 days.                      | 4.      | £30.                 |    |       |
| F2.—1. | 6½ lbs.           | 6. | ½.              |    |                               |         |                      |    |       |
| G2.—1. | 10% gain.         |    |                 |    | 2 miles 1 fur.                | 16 per. |                      |    |       |
| H2.—1. | 2½%.              | 2. | 2·05.           | 3. | 19½, 22½, 24½, 27½, 29½, 32½. |         |                      |    |       |
| I2.—1. | 1½ acres.         |    |                 |    |                               |         |                      |    |       |
| H2.—1. | 2½%.              | 2. | 372.            | 3. | 8d.                           | 4.      | 2·3094.              | 5. | .556. |
| J2.—1. | £610.             |    |                 |    |                               |         |                      |    |       |
| I2.—1. | 18½.              | 2. | 220; 440.       | 3. | £32, 6s. 0·62d.               | 4.      | ·0007546.            |    |       |
| J2.—1. | 95½%.             | 6. | £9000, £6300.   |    |                               |         |                      |    |       |
| J2.—1. | 30%.              | 2. | ·583.           | 3. | £42.                          | 4.      | £40, 16s.            |    |       |
| K2.—1. | 23 gallons 2 pts. | 6. | £117, 5s.       |    |                               |         |                      |    |       |
| K2.—1. | 103½.             | 2. | £783, 2s. 6d.   | 3. | 180.                          | 4.      | 66½.                 |    |       |
| L2.—1. | £172, 16s.        | 6. | ·5·.            |    |                               |         |                      |    |       |
| M2.—1. | A, 48s.; B, 36s.  | 2. | 22½% loss.      | 3. | £236, 8s. 6d.                 |         |                      |    |       |
| N2.—1. | £1000.            | 5. | 36½.            | 6. | 3.                            |         |                      |    |       |
| O2.—1. | £27, 4s.          | 2. | £4, 0s. 6d.     | 3. | 16½%.                         | 4.      | £641, 14s. 8·37d.    |    |       |
| P2.—1. | £256.             | 6. | £8, 11s. 6d.    |    |                               |         |                      |    |       |
| Q2.—1. | 990.              | 2. | £187, 16s. 5½d. | 3. | 5s. 1½d.                      | 4.      | £1·578528.           |    |       |
| R2.—1. | £27, 4s.          | 2. | £4, 0s. 6d.     | 3. | 16½%.                         | 4.      | £1099, 11s. 3½d.     |    |       |
| S2.—1. | 3½%.              | 6. | ·0009920634.    |    |                               |         |                      |    |       |
| T2.—1. | 1026.             | 2. | 2450 sixpences. | 3. | 83½ mls.                      | 4.      | 4 s.                 |    |       |
| U2.—1. | 3d.               | 6. | 3½ days.        |    |                               |         |                      |    |       |
| V2.—1. | £398, 4s. 3½d.    | 2. | 3½%.            | 3. | A, £26; B, £20; C, £14.       |         |                      |    |       |
| W2.—1. | 91½.              | 5. | 25 eggs.        | 6. | 4½.                           |         |                      |    |       |
| X2.—1. | £4, 7s. 1½d.      | 2. | 50.             | 3. | Loses £5.                     | 4.      | 33½%.                |    |       |
| Y2.—1. | 6½ hours.         | 6. | £3, 17s. 3d.    |    |                               |         |                      |    |       |

## EXAMINATION PAPERS FOR MONITORS.

## D. FEMALES. 1888.

1. Theory. 2. £557, 13s. 9d. 3.  $8\frac{2}{3}\text{d}.$  4. 369. 5. 95 lbs.  
6. 10 years. 7. 3·142857. 8. £79, 10s. 10d.

## D. FEMALES. 1889.

1. 10 hours. 2. £800, 4s.  $4\frac{3}{4}\text{d}.$  3. Theory. 4. £1003.  
5. 462 lbs. 6. £1281, 19s. 0·7d. 7. 16. 8. £468, 16s.

## D. FEMALES. 1890.

1. 20942352 sq. feet. 2.  $5\frac{1}{2}\text{d}.$  3. %. 4. 10 days. 5.  $3\frac{1}{4}$ .  
6. £113, 8s. 1·8d. 7. 32 men. 8.  $3\frac{1}{8}\%$ .

## D. FEMALES. 1891.

1. 23. 2. £332, 19s.  $2\frac{1}{4}\text{d}.$  3. £125. 4.  $1\frac{1}{2}$  hours.  
5.  $18\frac{2}{3}\%$ . 6. 9s. 7. ·000041181137..... 8. ·256.....

## D. FEMALES. 1893.

1. £207, 10s. 3d. 2. (a) 7s.  $10\frac{1}{2}\text{d}.$ ; (b) 1·2876.  
3. (a) 203 ac. 2 rds. 13 per. 10 yds. 7 ft. 108 in.; (b) 6 ac. 0 rds. 3 per. 3 yds.  
4. £7173, 6s. 8d.; £8070; £8608; £8966, 13s. 4d. 5. (a) Theory;  
(b) 1805042408200. 6. £162, 7s.  $3\frac{1}{4}\text{d}.$  7. £21, 5s. 7d.  
8. 3·17083.

## D. MALES. 1888.

1. Theory. 2.  $123\frac{1}{8}\text{d}$  grs. 3. 15·617. 4. 33 per. 10 yds. 0 ft. 108 in.  
5.  $\frac{1}{3}\text{d}.$  6. £22, 6s. 8d. 7. 15 stones  $9\frac{2}{3}\text{d}$  lbs. 8.  $10\frac{1}{2}\text{d}.$

## D. MALES. 1889.

1. Theory. 2. 5 men. 3.  $4\frac{1}{4}\text{d}.$  4. 1. 5.  $828\frac{1}{2}\text{d}.$   
6. 24 mls. 7. 176. 8. 8000; 2·65; 630,000.

## D. MALES. 1890.

1.  $16\frac{1}{2}$  days. 2. 31 3. 2 cwts. 0 qrs. 7 lbs. 4. 40%.  
5. 5445 trees. 6. £72, 13s. 5·84d. 7.  $2\frac{1}{2}\text{d}.$

## D. MALES. 1891.

1. 81; £22, 12s. 2½d.    2. 5.    3. £1237, 5s.    4. 1s. 2½d.  
 5. 7½%.    6. 23½ days.    7. £43, 1s. 6½d.    8. £90.

## D. MALES. 1892.

1. £9, 8s. 11d.    2. 100 men.    3. 53411764.....    4. 8·38d.  
 5. 41½ yards.    6. Theory.    7. 2½%.    8. 50d.

## C. FEMALES. 1890.

1. 1s. 1½d.    2. 076.    3. 10½ hrs.    4. A has £25 more  
 than B; A,  $\frac{1}{4}$ ; B,  $\frac{1}{2}$ .    5. £5212½; £6, 2s. 4½d. decrease.  
 6. 25916.    7. Theory.    8. 6 : 7.    9. £7, 7s. 5½d.    10. 18½%.

## C. FEMALES. 1891.

1. 545.    2. £11, 19s. 4½d.    3. 400 oranges.    4. 4·24 perches.  
 5. Theory.    6. 1½.    7. 555; £5835.    8. 2½%.  
 9. 13·6 .....    10. Theory.

## C. FEMALES. 1892.

1. £78.    2. Theory.    3. 12½ days.    4. 22·51½.  
 5. £51, 4s. 3½d. increase.    6. 1 mile.  
 7. 2 ac. 0 rds. 10 per. 28 sq. yds. 6 ft. 72 in.; £24, 16s. 5d.  
 8. 567,342.    9. 8027·8 francs.    10. 1s.

## C. FEMALES. 1893.

1. (a) Theory; (b) £31, 15s. 3d.    2. 30 lbs.    3. 1½.  
 4. £1, 8s.    5. 34 : 35.    6. (a) 057771 &c.; (b) 1 qr. 15·26 lbs.  
 7. 4½ per cent.    8. 7 lbs. 3½ ozs.    9. Theory.  
 10. 1 lb. 6 ozs. 19 dwts. 6 grs.

## C. MALES. 1890.

1. ?    2. £75 loss.    3. 12½ hours.    4. 172½.    5. 1½ years.  
 6.  $\frac{1}{2}$ .    7. £1, 18s. 1½d.    8. 17½ days.    9. (a)  $\frac{4}{3}\%$ ;  
 (b) 1s. 7½d.    10. 3s. 3d.

## C. MALES. 1891.

1. Theory.    2. 102%.    3. 21½, 23½, 25, 26%, 28½.  
 4. £33, 1s. 6d.; gained £7, 1s. 9d.    5. 45 acres.    6. 2r.  
 7. 5s. 11½d.    8. 91½.    9. 2530.    10. 5 : 8 is the greater

L MARCH 1882

1. 1000. 2. 12 min past 7 P.M. 3. £200, 16s. 4d.  
4. 12 min. 5. 12 min. 6. 12 min.  
7. 12 min. 8. 12 min. 9. 12 min.

L MARCH 1882

1. 1000. 2. 12 min past 7 P.M. 3. 12 min.  
4. 12 min. 5. 12 min. 6. 5-12 min.  
7. 12 min. 8. 12 min. 9. 12 min. 10. 12 min.; 11.

MISCELLANEOUS EXAMINATIONS.

NINTH GRADE

1880.

1. 1000. 2. 27 per. 11 yds. 8 ft.  
3. 12 min. 4. 12 min. 5. 12 min. 6. 17½ hours  
7. 12 min. 8. 12 min. 9. 12 min. 10. 12 min. 11. 12 min.  
12. 12 min. 13. 12 min. 14. 20th March.

1890.

1. 1000. 2. 7 tons 18 cwt. 0 qrs. 16 lbs.  
3. 100. 4. 12 min. 5. 12 min. £5000; debts, £12,000.  
6. 12 min. 7. 12 min. 8. 12 min. 9. 40s. 10. 37-0405;  
11. 12 min. 12. 12 min. 13. £250, 16s. 4½d. 14. £15, 16s. 4½d.  
15. 12 min.

1891.

1. Three million seven hundred and three thousand six hundred  
and eighty-nine. 2. 24 sec. 2 rods. 14 per. 5 yds. 4 ft. 56 in.  
3. 100. 4. 12 min. 5. 12 days. 6. £900. 7. 16½ months  
8. 12 min. 9. 12 min. 10. £3, 12s. 11. 12 min.  
12. 12 min. 13. £5, 1s. 10-325d. 14. 4½ years.

1892.

1. 12 min. 2. 12 min. past 7 P.M. 3. £204, 16s. 5½d.  
4. 12 min. 5. 37½ min. 6. £120. 7. 1½. 8. 1-810000.  
9. 12 min. 11s. 11½d. 10. £59, 15s. 0½d. 11. 4½  
12. 12 min. 12. 725,900.

## 1893.

1. 1 ac. 3 rds. 5 per. 6 sq. yds. 2 sq. ft. 62 sq. in.      2. 3s. 9d.  
 3. Coat, £6, 6s. 8d.; trousers, £1, 18s.; vest, 12s. 8d.    4. 16 $\frac{1}{2}$  miles.  
 5. 10 $\frac{1}{2}$  days.      6. 3 $\frac{1}{2}$ .      7. 3696.      8. .00798; .1218372.  
 9. £531, 19s. 6 $\frac{1}{2}$ d.      10. £10, 3s. 5 $\frac{3}{4}$ d.      11. £12,242, 17s. 1 $\frac{1}{2}$ d.  
 12. 307·04.      13. 61 feet.      14. 207·4.
- 

## MIDDLE GRADE.

## 1889.

1.  $\frac{14}{15}$ .      2. 2199 statute poles.      3. £26, 3s. 4 $\frac{3}{4}$ d.      4. 12.  
 5. 20 years.      6. 6·1441; .00003519.      7. 13 yards.      8. 31·07.  
 9. 2 $\frac{1}{2}$  years.      10. £183, 6s. 8d.      11. 19·47.      12. 83 $\frac{1}{4}$ .  
 13. £1, 9s. 9 $\frac{1}{2}$ d. (allowing 3 days of grace).      14. £1717.

## 1890.

1.  $\frac{1}{2}$ .      2. 7·2510 and 2·1252843 $\frac{1}{2}$ .      3. 180 $\frac{1}{2}$  days.  
 4. 220 yards.      5. £1266, 5s. and £178, 6s. 7 $\frac{1}{2}$ d.      6. £71.  
 7. 947404.      8. 513·5.      9. 4%.      10. £7, 10s.      11. £750.  
 12. £50.      13. Increased by £5.      14. 4%.

## 1891.

1.  $\frac{1}{2}$ .      2. 6s. 6d.      3. (1) 38 $\frac{2}{3}$ ; (2) 32 $\frac{1}{3}$  min. past 7.  
 4.  $\frac{1}{1000}$  loss.      5. £1162, 10s.      6. 311·12.      7. 45 ft. 6 in.  
 8. 3.      9. £2500.      10. 4 $\frac{1}{2}$ % gain.      11. 9s. 7d.      12. £14,520.  
 13. £989, 19s. 8 $\frac{1}{4}$ d.      14. 10·38d.

## 1892.

1. 125,800,445,542 ac. 1 rd. 24 p.      2. 016.      3.  $\frac{1}{2}$ .      4. £2, 2s.  
 5. 2 miles per hour.      6. 5%.      7. 1 inch.      8. 10.  
 9. £246, 14s. 3d.      10. 4%.      11. 12 $\frac{1}{2}$ %.      12. 18 $\frac{1}{4}$ %.  
 13. £3, 2s. 6d.      14. £1, 5s.

## 1893.

1. 108,199,352.      2. £5, 9s. 5 $\frac{1}{2}$ d.      3. 16·290125 gallons.  
 4. 4s. nearly.      5. 3 $\frac{1}{4}$  hours.      6. 275 days.      7. 11·37.  
 8.  $\frac{1}{2}$ .      9. £97, 13s. nearly.      10. 66 $\frac{2}{3}$ % gain.      11. 5%.  
 12. £784, 17s. 6d.      13. £772, 17s. 6d.; £46, 6s. 3d.













